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# USSR Report

NATIONAL ECONOMY

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9 FEBRUARY 1987

USSR REPORT  
NATIONAL ECONOMY

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## ECONOMIC POLICY, ORGANIZATION, MANAGEMENT

### CHANGING CENTRALIZED MANAGEMENT FUNCTIONS VIEWED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 10, Oct 86 pp 39-47

[Article by Candidates of Economic Sciences F. Klotsvog and D. Matsnev, under the rubric: "Planning Theory and Methodology": "Improving Centralized Planning Management of the Economy"; passages enclosed in slantlines printed in boldface in text]

[Text] Improving national economic planning presupposes increasing the independence of associations and enterprises; differentiation of methods of managing the formation of economic proportions; and increasing horizontal ties in the system of economic levers and incentives.

It was emphasized in the Political Report of the CPSU Central Committee to the 27th Party Congress that radical reforms are required in the economic mechanism--reforms which would provide for the creation of an integrated, effective and flexible management system. Such a system would permit fully utilizing the advantages of socialism at the contemporary stage by means of further strengthening and developing both bases of the principle of democratic centralism: centralized planning management, and independence of the basic production units--the associations and enterprises.

Intensification of the economy and the successive increase in the economic independence of the associations and enterprises requires increasing the effectiveness of centralized planning management in ensuring proportionality in the reproductive process on the scale of the national economy. At the same time the development of centralism envisages not the expansion and intensification of administrative methods, but deepening the scientifically-founded and strategic nature of the work of the central economic management organs.

One serious problem in reforming the management of the national economy is determining the objective limits and finding concrete forms for combining centralized management with the successive expansion of the independence and initiative of the basic production unit. In our opinion, solving this problem presupposes /differentiation of methods of managing the formation of various economic proportions./

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\*By way of discussion.

Such an approach proceeds directly from the decisions of the 27th CPSU Congress. At the Congress the necessity was indicated for concentrating the functions of the national-economic level of economic management at a central institution for overall economic, inter-branch, and regional ratios of social production, which would provide for more completely resolving the ultimate socio-economic tasks for societal development. At the same time, the central planning organs should refrain from interfering in the process of formulating the inter-branch, inter-industrial and inter-regional ratios, having transferred the given functions to the jurisdiction of the corresponding links in the system of planning management.

Such a change in the functions of the central planning organs presupposes extensive development of a system of horizontal economic ties among associations, enterprises, ministries and departments; these ties must become the basic instrument for formulating the inter-branch and inter-industrial ratios within the framework of centralized establishment of inter-branch and inter-regional proportions of social production. Coordination of the detailization of state-planned tasks for production and distribution of products will be accomplished under these conditions, on the basis of contracted, horizontal economic ties. And the horizontal economic ties will take on the form of commodity-monetary relationships. At the same time the economic role of the user of the products must be principally increased in the structure of the economic relationships, having significantly expanded its rights to determine the specific list of the products and the choice of supplier, as well as the right to provide material incentives to the goods producers.

/Improving the economic mechanism requires chiefly qualitative improvement of the system for centralized planned management of the national economy, and strengthening the role and changing the functions of the unified national economic plan in an integrated system of management and control. Centralized planning must create a purposeful and at the same time flexible "fundamental framework" for the process of expanding production, within whose bounds there remains a broad field of activity for creative initiative and independence of the basic production links--the associations and enterprises./

At the same time the basic functions of USSR Gosplan will consist of:

revealing the structure of the ultimate needs of society and formulating the socio-economic program of the plan in accordance with the long-term goals of socio-economic strategy;

determining the economic resources and capabilities for increasing the effectiveness of their use on the basis of the achievements of scientific-technical progress;

formulating an integrated, developed system for expanded production, which determines the general-economic, inter-branch and regional ratios for the development of the national economy for the planning period;

establishing integrated tasks for the branches and regions for developing production which ensure fullest satisfaction of society's ultimate needs;

distribution among branches and regions of the basic production resources necessary to carry out the planned production tasks under conditions of increasing to the maximum possible extent the level of effectiveness of resource use;

planned management of a system of economic levers and incentives, which will permit achieving the most complete coincidence of the interests of the labor collectives of enterprises, branches and regions with the ultimate goals of socio-economic development; and,

implementing active control over the pace of economic development, and over achievement of established general-economic, inter-branch and inter-regional proportions of social production.

Realizing these functions of national economic planning requires introducing the appropriate changes in its methods and organization.

The method for working out national economic plans must differ in a qualitative manner from the methods for formulating plans at the branch level and even more so at the enterprise level. The methodology of national economic planning should consider above all the objective unity of the process of reproduction, the close functional interaction of all its elements, and the regularities and tendencies which develop in the national economy under the influence of scientific-technical progress and the influence of social factors. At the same time the methods of national economic planning must continue to be a wide field of activity for developing the economic independence and initiative of ministries and departments, associations and enterprises, in establishing the most rational intra-branch and intra-industry proportions, and for seeking out additional reserves for increasing the effectiveness of social production within the framework of the tasks and resource ceilings established for them.

The general lines for improving the methodology of national economic planning, in our view, are:

developing an integrated reproductive approach to national economic planning and overcoming outmoded tendencies for formulating the national economic plan by means of "welding" the branch plans together;

increasing attention toward production and non-production requirements as the decisive factor for formulating planned general-economic, inter-branch and regional ratios under conditions of the high level of social production achieved, and the addition of the traditional resource approach with estimated national economic requirements;

significantly increasing the active role of qualitative plan indicators, and especially the indicators for effectiveness of resource use, changing them from a means of analysis of planned proportions, into the basic instrument for determining the quantitative plan indicators under conditions of intensification of social production and accelerating scientific-technical progress;

achieving a higher level of coordination between the physical-material and the cost aspects of the national economic plan, and turning financial planning into a system for formation of economic levers and incentives which direct the economy toward realization of the planned physical-material proportions; and,

extensive introduction to planning of economic-mathematical methods for modeling the social production process, which provide the capability to take into account in the national economic plan the complex system of interrelations and interdependencies which exist objectively in the overall national economic complex.

Realizing these basic lines for improving the methodology of national economic planning requires primarily ensuring the leading role of comprehensive planning of the rates and proportions of the country's socio-economic development. Under conditions of concentration of the functions of national economic planning for establishing the general economical, inter-branch and inter-regional proportions, this section of the plan must become the key structural support of the entire national economic plan. For this it is necessary to make active use of the national economic balance and the inter-branch balance at all stages of working out the plan. At the present time the national economic balance estimates are used mainly for formulating a conception of the plan at the initial stage of its development, and also for deriving generalized national economic indices at the concluding stage of plan formation. But adopting concrete planning decisions in the course of working out the plan takes place, as a rule, without considering their influence on the rate and proportions of socio-economic development, or on the structure and effectiveness of social production. The experience of preparing the draft Basic Directions for the 12th Five Year Plan has shown that /actively using consolidated balance estimates, and specifically the inter-branch balance, as an instrument of operational control over the planning decisions taken, and analysis of their national economic consequences, is an important factor for increasing the scientific basis of the plan, and for qualitatively improving its state of balance and the degree to which it is directed toward final socio-economic results./

The use of consolidated balance estimates at all stages of working out the plan ensures consideration of the effects of the social factors on the entire system of plan proportions and indicators.

The new methodological approaches must be manifested in the planning for production and product distribution. /A primary requirement is to switch to use of an consolidated list of products, consisting of associated groups of products which serve the purpose of structural formation in the process of formulating national economic and inter-branch proportions, and which embrace in terms of cost the basic part of the production of the corresponding branches./ Research has shown that such a list of products takes in from 250-300 kinds of industrial and agricultural products, including: for the raw material and fuel-energy branches of industry--140-170 positions; for the machine-building and metal-working industry--70-80; and for agriculture, light and food industries--40-50 positions.

This list permits formulating with the required degree of uniformity the variants for developing national economic and inter-branch proportions, and selecting from them those which provide for the most complete realization of the socio-economic goals of the given planning period. The ceilings for resources allocated to the branches and the regions should then be established in accordance with this list.

At the branch level this list could be specified for about 3,000-5,000 positions. For this degree of uniformity, the tasks for production and resource ceilings must be given to the basic production links--the associations and the enterprises.

For every position on the consolidated list of goods, estimates must be made of the demand in the national economy for the corresponding products, and tasks must be defined for their production and distribution by the primary holder of capital.

The determination of demand for specific kinds of production must be laid to the appropriate ministries and associations. They have been made responsible for this in accordance with existing statutes--which, however, are hardly ever implemented, since in practice the ministries and associations have been freed from balance accounting work. Under contemporary conditions they answer only for fulfilling production plans, but are not answerable for what they make.

Putting the *soyuzglavsnabsbyts* [Main Administration for Supply and Sales at USSR Gosplan] and the *soyuzglavkomplekts* [Main Administration for Supplying Sets of Equipment, Accessories, Instruments, Means of Automation and Communication, Cables and Other Articles to Especially Important Construction Projects in the Coal, Petroleum and Other Industrial Branches, at USSR Gosplan] under the control of the branch ministries may be the organizational prerequisite for ensuring their active participation in this work. This question has already been raised in the press.<sup>1</sup>

/In planning the production and distribution of products it is deemed expedient to shift the center of gravity from the production indicators to the indicators for interbranch deliveries, and to make production volume indicators merely estimates./ These programs could be compiled by the ministries and departments on the basis of branch deliveries--in total (in terms of cost) and according to the consolidated lists (in physical terms and in terms of cost) with distribution according to basic holder of capital. At the same time the indicator for net production should be used as the cost indicator, which characterizes the volume of work of the branch, association or enterprise, and estimates of normative-net production should be abandoned.

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<sup>1</sup> PLANOVoye KHOZYAYSTVO, 1985, No 8, pp 32-33.



The coordinated itemization of the interbranch indicators for interbranch deliveries and the correlation of the needs of the specific range of goods for the production plan should be implemented by the appropriate ministries, associations and enterprises with the aid of a system of horizontal economic ties between the producers and consumers of the products. Under these conditions, /the horizontal economic ties are realized in the form of contract relationships among the ministries, departments, associations and enterprises./ Moreover, the system of contracts will include the entire volume of interbranch product deliveries and will incorporate the specific list of goods for deliveries of forecast and centrally-planned production within the limits of the tasks established by the national economic plan and the resource ceilings for the consolidated units; the system will also take in the delivery volume for specific kinds of expanded production, as well as the requirement for quality of production and the terms and conditions for deliveries. In addition, the contracts must establish the amounts of the bonus to the supplier for completely fulfilling their conditions and for high-quality production; they must also establish economic sanctions for violation of contracted obligations.

At the ministerial level the contract should also reflect the list of goods for deliveries as a state of distribution appropriate to the interbranch division of labor between the branch associations and enterprises which has taken shape. Contracts among enterprises will list the specific goods, right down to specific articles.

/In the course of establishing and implementing contracted relationships the consumer must be given the right to negotiate with the agreement with the supplier to make downward adjustment to the indicators of the state plan for product deliveries; and the producer of the products, to make upward adjustment to the plan for product delivery, with the consent of the consumers./ This will create conditions which will prevent the planned volume indicators from hindering structural realization of production in accordance with the real needs of the consumer.

Developing horizontal economic ties for consumer goods production significantly strengthening the role and increasing the responsibility of trade for formulating a structure for production of foodstuffs and non-food goods appropriate in terms of assortment and quality to the growing needs of the populace. The basic force for implementing these tasks is development of a system of contract relationships which reflects the demand for goods in terms of assortment and quality, and the conditions for awarding bonuses and punitive sanctions.

/The system of horizontal economic ties must embrace not only the processes of production and distribution of the range of labor, but also the processes of reproduction of fixed capital and material substitution. To do this, it is necessary to accelerate the development of contract relationships among the clients, the construction subcontractors and the suppliers of the equipment. These relationships will determine the volume of work and deliveries required and also the conditions for awarding bonuses for successful fulfillment of contracting obligations, and the amounts of the punitive sanctions for their violation.

/Plans for major construction projects must reflect all stages of the process of reproduction of fixed capital, including its creation, use, and renewal; and, there must be direct interaction between planning the reproduction of capital and planning social production./

A project-by-project approach predominates in current planning practice for major construction projects, which prevents realization of the principle of allocating capital investments under planned production values. The project-by-project approach stimulates constant renewal of fixed capital, which is acutely felt in conditions of the contemporary orientation toward the technical retooling of the branches of the national economy.

The basic method for solving the given problem is transition to establishing direct mutual ties between the determination of branch ceilings for capital investments and the estimates for the use of fixed production capital. Such a method has now been worked out and has been implemented to a significant extent in preparing the draft Basic Directions for the 10th Five Year Plan.

In planning major construction projects at the national economic level it is deemed expedient to establish ceilings, broken down by branch and regional areas, for volume of capital investments and construction-installation operations. Tasks for volume of introduction of fixed capital and production capacities should be determined by directive only for the ministry-contractors. In our opinion the practice of compiling specific, itemized lists with USSR Gosplan should be abandoned, submitting for approval instead only the lists of especially large construction projects.

Determining branch ceilings for capital investments should be accomplished on the basis of: amalgamated indicators for the ratio of output per ruble of capital invested; planned coefficients for retirement or withdrawal of fixed capital or assets; and normative proportionate capital investments per unit of capacity put on-line. At the same time at the national-economic level it is important to establish the indicators for major construction plans according to union republics and economic regions. Under these conditions, project-by-project distribution of capital investments, the choice of the form of reproduction (new construction, expansion and reconstruction, or technical retooling) would be defined by USSR ministries and departments, coordinated with the union republic Councils of Ministers, and reported to the central planning organs. Restructuring the construction management system on a territorial principle is an important prerequisite for realizing such a procedure for planning and organizing capital construction.

In contemporary conditions, the planning of scientific-technical progress for the purpose of increasing its effectiveness must be organically combined with the planning of production effectiveness. Above all, it is important to strengthen the influence of the Comprehensive Program for Scientific-Technical Progress on the process of developing the national-economic plan. The program program is not yet having the required effect on the plan's indicators and proportions. This is explained primarily by the fact that in aggregate, the scientific-technical ideas and directions for scientific-technical progress contained in the Comprehensive Program are not addressed



to specific economic organs, and are not expressed in the form of specific indicators for the effectiveness of use of production resources, which could be directly brought to bear in working out the national-economic plan.

It would appear that the solution to the problem at hand consists of combining branch economic science with formulation of the scientific-technical policy of specific branches, and analysis of its influence on the effectiveness of their work. In order to do this, in our opinion, /it is necessary when formulating the five-year national economic plan to develop branch programs for scientific-technical progress and for increasing the effectiveness of production for the forthcoming five-year period./ These programs could be compiled by the ministries and departments on the basis of the Comprehensive Program for Scientific-Technical Progress, and could contain specific directions for the planned scientific-technical policy for branch development and an analysis of their effects on the indicators for effectiveness of use of basic production resources, necessary for the development of the given branch. The materials for the branch programs for scientific-technical progress and for increasing production effectiveness must be examined by USSR Gosplan, compared with the corresponding sections of the Comprehensive Program for Scientific-Technical Progress and put directly to use in working out the basic directions and the draft five-year plan.

At the national-economic level it is considered expedient to implement the management of scientific-technical progress primarily by means of formation of requirements for increasing the indicators for effectiveness of social production: accelerating growth of labor productivity; increasing the yield on capital investment; reducing the proportional expenditures of the most important kinds of raw materials, supplies, fuel and energy; and so on. The effectiveness of these indicators can be ensured not so much by virtue of making them directive in nature, as much as through turning them into a direct instrument of inter-branch distribution of resources.

In existing planning practice the indicators for effectiveness of resource use are defined, as a rule, at the final stage of work on the plan and fulfill primarily analytical functions of control over the quality of the planning decisions taken. Therefore, these indicators do not play their assigned role in plan for scientific-technical progress. In order to increase the efficacy of the indicators for effectiveness in national-economic planning they must be defined at the initial stage of plan development, based on branch program for scientific-technical progress. At the same time it is fitting to reexamine the structure of the indicators adopted for relative expenditures of production resources, putting them in accord with the consolidated lists for production and product distribution. As a result it would appear to be possible to abandon establishing by directive tasks for reducing the individual norms for material resource expenditure and other individual indicators for effectiveness of their use. By the same token the method of resource distribution itself should be made more precise, considering the consolidated list for planned indicators of their proportional expenditures and other indicators of effectiveness.

Ministries and associations, after receiving tasks for product deliveries and resource ceilings, must specify the branch scientific-technical programs and organizational-technical measures which would ensure the necessary increase in effectiveness.

Comprehensive scientific-technical programs must be worked out at the national-economic level for the most important directions of scientific-technical progress of a multi-branch character, which provide a significant national-economic effect, and which require major expenditures. Supervision of the development and implementation of these programs must be the most important function of the USSR State Committee on Science and Technology.

/Under conditions of establishment of an integrated system for managing the economy, based on a steady increase in the economic independence of the branches, associations and enterprises, the planning of systems for economic levers and incentives becomes extremely important./

Increasing the effectiveness of a system of economic levers and incentives, and directing it toward increased effectiveness in resource use and acceleration of scientific-technical progress envisages above all /strengthening the incentive role of wages,/ and making wages the basic form of material incentive.

At the same time national economic plans must ensure the direct dependence of the level of wages on the quality and quantity of production, and the production effectiveness of the given branch. A wage normative must be established per unit of net production or its increase in consideration of the calculated correlation between growth of labor productivity and the average wages of a single worker. At the same time, more rapid growth of average wages must be established in those branches where the increase in labor productivity is achieved with relatively improved dynamics of capital returns. Such an approach toward wage planning will stimulate higher production growth rates with the least expenditure of resources.

Differentiation of branch wage normatives for the individual associations and enterprises must be set up on the basis of these same principles. The wage system for individual workers must be determined basically by the labor collectives themselves. A practical example of such an approach is widespread introduction of collective forms of labor organization and incentives (the brigade contract, and others).

It is time to abandon the existing practice of formation of material incentive funds for fulfilling directed planned tasks from a higher level of management in accordance with one qualitative indicator or another. These funds can be formed by means of economies in production resources, based on the introduction of the achievements of scientific-technical progress, as well as by means of remuneration received from the product consumers for full and qualitative fulfillment of contracted obligations. Under these conditions the associations and enterprises should implement a gradual transition to complete self-sufficiency, which envisages that the sole form for redistribution of net income is a system of payments for production resources on the basis of centrally-regulated rules and economic normatives.

Under the existing price system these norms will be similar to a planning indicator; that is, they will be worked out and approved as part of a five-year national economic plan; they will be differentiated according to branch by GOSPLAN (in conjunction with the USSR Ministry of Finance), and according to individual enterprises, by the appropriate ministries and departments. In the future, to the extent that experience is gained in using these norms and carrying out reforms in the price formation system, it would appear possible to switch to a uniform system of economic norms for long-term operation, differentiated only by types of resources.

After making payments for resources, the remaining portion of planned profits will remain at the disposal of the enterprise and, in our opinion, can be directed toward formation of two funds: for developing production and for incentives to suppliers.

The production-development fund will create conditions for improving production at a given enterprise or association.

Formation of a system of horizontal incentives is proposed on the basis of the fund for incentives to suppliers. The essence of this system is to award bonuses from the indicated fund for complete and timely fulfillment of contracted obligations. These bonuses are to be established on a contracted basis, and differentiated depending upon the quality and the degree of difficulty of acquiring the products to be supplied. Such bonuses will become the basic source of the material incentive and socio-cultural development funds at the supplying enterprises. Since each enterprise is also the supplier of some kind of product, it is also capable of forming its own funds for material incentive and socio-cultural development by virtue of the benefits received from its consumer organizations and enterprises. Above-planned profits, received by virtue of more economical use of resources (in comparison with the plan), can serve as still another source for formation of these funds.

Thus, /the funds for developing production and the funds for supplier incentive are formed in the process of the initial distribution of profits, and the material incentive and cultural development funds, during redistribution of profits./ With such a system of horizontal stimuli the producer of the products has less interest in unjustified price increases for his goods, which creates conditions for greater price stability and for the accounting and distributive function which the prices perform. Incidentally, this is an effective means for the customer to influence the supplier, and it is a genuine economic lever for increasing the quality of the products and increasing the orientation of production toward satisfaction of social needs.

Practical realization of the basic directions for improving the methodology of national economic planning expounded above presupposes increasing the role of the five-year plans, truly making them the basic instrument for planned management of the economy. In order to do this it is first of all necessary to increase the quality of the five-year plans, and to ensure that arbitrary decisions, not supported by real resources, are not taken during plan development.

Planning must embrace all aspects of social production and define tasks for the distribution of resources in the form of indicators for interbranch deliveries. At the same time the indicators for both five-year and for annual plans must be established in accordance with the consolidated plan proposed above.

Defining in the five-year plan the economic normatives for the long-term, stable for the five-year plan but differentiated on a yearly basis, will also increase the plan's significance.

In order to strengthen the role of the uniform national-economic plan, including the five-year plans, the practice and forms of use of the programmed-objective approach in the integrated system of management of the economy should be reexamined. Apparently, /the practice of preparing and adopting comprehensive programs and decisions on individual economic questions of a long-term nature, prior to the approval of the overall national economic plan, which are not connected with it, should be abolished./ This practice is a serious hindrance to the creation of balanced national-economic plans. National-economic comprehensive programs and separate decrees on especially important problems should be worked out and situated as a means of carrying out major structural changes outlined in the national economic plan. Under this condition the comprehensive programs will implement the itemization, will specify the indicators of the national economic plan for the corresponding problem, and will define the system of technical, economic and organizational measures to ensure its solution within the established periods. Thereby they will serve as an additional instrument for centralized influence on the formation of the proportions for economic development.

Implementing the proposed directions for improving national-economic planning will, in our view, permit increasing the effectiveness of centralized planning management of the economy, freeing the enterprises and associations from petty details, and more fully utilizing hidden reserves for production.

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KUBAN COMBINE EXPERIMENT OPERATIONAL RESULTS EXAMINED

Moscow EKONOMICHESKAYA GAZETA in Russian No 49, Dec 86 pp 10-11

[Article by F. Bogomolov and M. Ovdiyenko, Krasnodar Kray: "Practical Experience Examined"]

[Text] Two years have passed since the Kuban agroindustrial combine, the structure of which includes 58 enterprises and organizations and 13 ministries and departments, was created in Timashevskiy Rayon in Krasnodar Kray. During one of its sessions the Politburo of the CPSU Central Committee singled out the positive operational results of the combine.

In the absence of statistical information, it is our opinion that the arguments supporting successful production work by the Kuban Combine will not be quite so convincing. Thus a need exists for certain figures which describe the work of its collective under the new conditions. The following observation should be made immediately: the results achieved during the period that has elapsed may not seem too great to some. However, it should be remembered that the combine has survived its formational period. And this was not a simple matter. Nevertheless...

If we compare the results for this year, when the chief organizational concerns of the reorganization were behind us, against the average data for the 11th Five-Year Plan, then we will see the following. Grain production increased by 13.3 percent, the principal crop -- wheat -- by 37.5 and milk and meat -- by 11-14 percent. The purchases of these types of products increased noticeably.

During a two-year period following the creation of the Kuban Combine, enterprises for the processing of vegetables, fruit, berries and tea and for the production of various types of meat, baking and other products were expanded and new facilities built. Approximately 4 million rubles were expended from the combine's centralized funds for the modernization and technical re-equipping of such enterprises. According to the testimony of specialists, these enterprises did not possess such potential prior to the creation of the agro-industrial combine. The combine increased its profits by 4.8 percent during the two-year period of its operations.

However, there are figures which do not describe the direct production activity of a labor collective and yet nevertheless make themselves known on the economic



scales. Permit us to cite two such figures. Compared to last year alone, the placing in operation of apartment dwelling space at the Kuban Combine increased by a factor of 4.5 and pre-school institutes -- by a factor of 5.6. Obviously, there is no need for interpreting the importance of such growth.

We asked the general director of the agroindustrial combine Mikhail Mikhaylovich Lomach: what is his personal explanation for the causes of the changes taking place?

"First of all" he stated, "an opportunity has been created for one organizational center -- the combine's leaders and specialists -- to control the production, procurements, transporting, processing and sales of agricultural products. Exactly how use is to be made of this opportunity is another matter altogether. Here there is a whole series of problems for which we are attempting to find solutions."

"Yes, and the most important consideration" he continued, "is that of persistently introducing economic methods for management in all of the combine's subunits. Their labor collectives must operate in accordance with the principles of self-repayment."

Thus, maximum emphasis must be placed upon the economic methods of management. What is the essence of these principles? What has been done in this regard and what still remains to be done in order to improve the situation?

#### Attitude Towards the Plan

Today the Kuban Agroindustrial Combine is a unified production-economic complex. However, the production of farming and animal husbandry products, the industrial processing of these products, construction, trade and other branches are all concentrated in it. Naturally, the question arises: how, to whom and exactly what type of planning is carried out?

A statute governing the Kuban Agroindustrial Combine reads as follows:

The five-year and annual plans for the economic and social development of the combine on the whole call for product delivery volumes for the all-union and republic funds based upon the plans for its production activities, payments into the budget and appropriations from the budget, the overall wage (normative) fund and the volumes of logistical resources allocated to the combine. All of the remaining plan indicators are reviewed and approved by the combine.

"What changes have taken place?" asked the acting chief of the Planning and Economics Department Aleksey Petrovich Larin, "At the present time, the plans call for six types of products to be delivered to the all-union and republic funds: meat, milk, eggs, vegetables, fruit and grapes. The combine and not the kolkhozes or sovkhoses is responsible for the carrying out of these deliveries. The sales volumes for the agricultural products is planned by it, including sales to the processing, trade and other enterprises."

Production operations, including all of the production parameters, are planned by the farms themselves. The combine's departments for the production of farming

and animal husbandry products, procurements and sales operate in close contact with one another and they issue corrections with regard to the delivery addresses for the products, the assortment and the volumes.

The wage fund for all of the combine's subunits is planned based upon the norm for 1,000 rubles worth of marketable products, that is, the leaders of a particular subunit can themselves determine the number of workers and, using the funds thus saved, they can issue incentives to those deserving of them.

With the change in planning the wage fund, a new system for issuing material awards for work performed by the combine's leaders and specialists was introduced into operations simultaneously.

"Each one of them" stated the chief of the Department of Organization, Wages and Social Problems Vera Borisovna Rybnikova, "knows the rate for the sale (gross) of 1,000 rubles worth of products. For the combine as a whole, it amounted this year to 0.73 rubles, but it was differentiated by quarters: during the first quarter -- 1.2 rubles, the second -- 1 ruble, the third -- 0.42 and the fourth -- 0.77 rubles. In addition, for each percent of increase in profit compared to the preceding year, they receive a monthly amount. And an advance is issued over the course of a year's time -- 90 percent of the monthly amount."

We would only ask: are the leaders and specialists satisfied with this system of wages?

"In my opinion, a more effective system for issuing material awards must be found" was the answer received, "Indeed, what is happening at the present time? Let us say that the collective of the Department of Procurements and Product Sales performed unimportant work. And the wages will be reduced for those who performed poorly. Thus we are speaking here of the need for introducing inter-branch cost accounting for definite types of products -- from production to their sale."

It bears mentioning that this thought was emphasized by the combine's general director during a discussion he held with us. The problem was as follows. We had in mind material awards based upon the final result. This was all very correct. But for a kolkhoz or sovkhoz the final result is the sale of the product. How will it be used at the processing enterprises? What will be the quality of the food goods delivered to the consumers? Where and in what manner will the interests and responsibilities of those who produce the products and those who trade in them come together? At the present time, thought is being devoted to solving this difficult problem within the Kuban Agroindustrial Combine. And the solution for it will undoubtedly prove to be of great assistance to the 14 similar combines which are to be created throughout the country.

#### Changes in Logistical Services

The leaders of kolkhozes and sovkhozes have registered many complaints against enterprises and organizations of the former Selkhoztekhnika. And the cost of the services furnished by them has been very high and the quality of such service, to say the least, left a great deal to be desired. Yes and today, just

as in the past, the same reproaches are being heard in a number of rayon agroindustrial associations and committees where the technical service would appear to be in keeping with the interests of production.

This is why it was pleasant for us to hear the following statement being made by the combine's deputy general director Anatoliy Andreyevich Nikishin:

"At the present time, our enterprise for repair work and technical services has ceased to be an object for serious criticism. I have in mind those services which this enterprise is carrying out for all of the combine's subunits."

What changes have taken place here? First of all, a change has taken place in the approach being employed for planning services. Approximately 2-3 months prior to the beginning of the new year, the enterprise for repair work and technical services distributes a so-called questionnaire or, more simply, a list of all services which it can carry out using its own resources. The work volume of this collective for providing technical services is determined based upon the results of this questionnaire sent to kolkhozes and sovkhoses.

There is still one other equally important detail. The prices for services are established by the combine's council in a manner so as to ensure a profitability on the order of 8-9 percent for this enterprise engaged in carrying out repair work and providing technical services.

And there is one other point deserving of mention. The earnings of the enterprise for repair work and technical services declined over a period of two years. Nor was this the result of a reduction in the volume of repair work. First of all, an improvement was realized in the quality of the services being rendered and, as a result, the operating efficiency of the technical equipment improved. Secondly, the reduced prices for services were reflected in the earnings. And thirdly, a definite proportion of the technical servicing work was being carried out at kolkhozes and sovkhoses.

And now a few words regarding the organization of logistical supply here.

The statute governing the operations of the Kuban Agroindustrial Combine reads as follows:

In the absence of funds, the combine can acquire products from other enterprises and organizations which were sold without orders, surplus material values and it can also purchase the required objects of logistical support through wholesale or retail trade, in conformity with existing legislation.

"The presentation of such opportunities to our kolkhozes, sovkhoses and other enterprises" stated the deputy general director of the combine A. Nikishin, "initially led to the acquisition of needed and unnecessary objects. Naturally, the psychology of an economics executive had an effect here. Formerly, he would issue a request for a particular item of equipment which exceeded his true requirement by a factor of 2-3. In the process, he assumed that his request would be cut back leaving him with the amount needed."



Thus an opportunity was presented for freely purchasing a good set of technical equipment. It should be stated directly that the "appetites" of some of the leaders and specialists turned out to be large and yet economically unjustified. Thus, at the present time some of the materials acquired are having to be sold to others.

The economic executives themselves have already drawn definite conclusions based upon the new conditions for supply. We can confirm this by citing some figures. In 1985, the combine's kolkhozes, sovkhoses and other enterprises acquired 15 million rubles worth of logistical resources and this year -- five million rubles less. And the requests for 1987, in a summary expression, amount to 8 million rubles worth. Thus in this instance the saying "appetite came while eating" assumed a somewhat different shade of meaning.

In the opinion of leaders and specialists attached to the agroindustrial combine, the organization of wholesale and retail trade in logistical resources must be oriented not towards satisfying the unlimited requirements of consumers. The normative periods for the operation of the various items of technical equipment must be taken into account. In other words, conditions must be created which will allow the kolkhozes and sovkhoses to be confident that the technical equipment and units needed for replacing items which have outlived their usefulness can be procured within a definite period of time and without excessive delays.

How does one evaluate the changes taking place at kolkhozes, sovkhoses and other enterprises of the combine in the organization of technical services and in the supplying of material resources? We paid a visit to the Rossiya Kolkhoz. The chairman of the board, Vladimir Grigoryevich Kulik, replied to this question in the following manner:

"Earlier, prior to the creation of the agroindustrial combine, various types of agreements and explanations had to be concluded before ordering non-standard equipment. Today, the combine's enterprise for repair work and technical services presents experimental models for the various types of equipment. If something does not satisfy us, we make a note of the situation and the unit is sent to the workshop to be placed in the proper working order."

"The carrying out of repair work on tractors, combines and other agricultural machines has been made easier" he continued, "Earlier, the kolkhoz concluded an agreement for a definite type of repair to be carried out by Selkhoztekhnika, an organization which did not always defend our interests. Today the agroindustrial combine ships equipment to the repair enterprises and is responsible for ensuring that it is returned to the farm in good operating condition. And large changes which are looked upon with favor by the farmers have taken place in the supplying of logistical resources. We can now obtain that which is needed for introducing into operations intensive technologies for the cultivation of agricultural crops."

We would add some figures to these words uttered by the chairman. This year, use of the intensive technology on the kolkhoz's grain fields made it possible to obtain 57.7 quintals of wheat and 71.2 quintals of barley from each hectare. The plan for selling grain to the state was fulfilled by 130 percent.

With an improvement in logistical supply, the level of production mechanization is being raised beyond any doubt and opportunities are appearing for carrying out all operations in farming and animal husbandry and all work at other enterprises included in the combine's structure during the best periods.

#### From A Department To A Store

All agricultural products being produced by the combine's kolkhozes, sovkhoses and other enterprises are being sold mainly via four channels: into the all-union and republic funds, to processing enterprises within the combine's system, directly to stores and on the foreign market.

The majority of the combine's enterprises engaged in the production and processing of agricultural products are located in Timashevskiy Rayon. And trade and public catering are represented by stores and cafes in the cities of Sochi, Novorossiysk, Anapa, Krasnodar, Timashevsk and other points throughout the kray.

The structure of the Kuban APK includes 23 stores and public catering enterprises, a meat combine with a sausage department, a creamery, a food combine, two mills, bakeries and other processing departments. Last year the volume of retail goods turnover amounted to approximately 19 million rubles and this year, according to estimates by specialists, it will reach roughly 43 million rubles.

By whom and how are the combine's stores supplied with marketable resources? One of the leaders of the Kuban APK emphasized in particular that trade in our stores will not be prestigious in the absence of meat product sales. There is no point to analyzing this statement. It is sufficient merely to state that the combine's sausage products are in great demand. They are supplied by an APK meat processing plant. Its director, Anatoliy Stepanovich Pelikh, acquainted us with its production organization and also with the attendant problems.

Of 30,000 tons of meat processed by the enterprise, 20 percent is used in the trade network of the Kuban APK. The remainder is turned over to the all-union and republic funds. The sausage department was designed for the production of only 3 tons of smoked products. True, its capability is presently being expanded by almost threefold. The plans call for the construction of a large combine for the production of smoked sausage products, ham and semi-finished goods -- almost 25 tons daily.

The prospects look good for an increase in the production of food goods, for which long lines of consumers are presently waiting at the combine's stores. We are convinced in this regard. However, according to the director of the meat processing enterprise, the path leading to such fine prospects is surrounded by various types of complications.

The combine's raw material zone remains just as before: the farms in three of the kray's rayons. Understandably, it is easier for the management of the processing enterprise to hold a discussion concerning the fulfillment of contractual obligations with its own combine kolkhozes and sovkhoses. On the slightest pretext, the council of the Kuban APK invariably interferes in the interest of setting matters straight. The situation is somewhat more difficult

in the case of suppliers from other rayons. The director of the meat combine is confident that the Timashevsk kolkhozes and sovkhozes, engaged as they presently are in increasing their production rates for meat resources, will match the capability of the processing enterprise.

The director of the meat combine has reproached those who plan the production of meat products. According to him, there is still a strong tendency towards basing the plans upon the level achieved. But indeed the meat products are produced from a corresponding volume of raw material resources. Hence the volume of these resources must be the initial indicator for determining the planned yield of finished products. This would seem to be a simple and yet correct requirement (sausage cannot be made out of nothing). And yet it happens at times that such simple requirements are ignored by the planning organs of the kray agroprom /agroindustrial committee/.

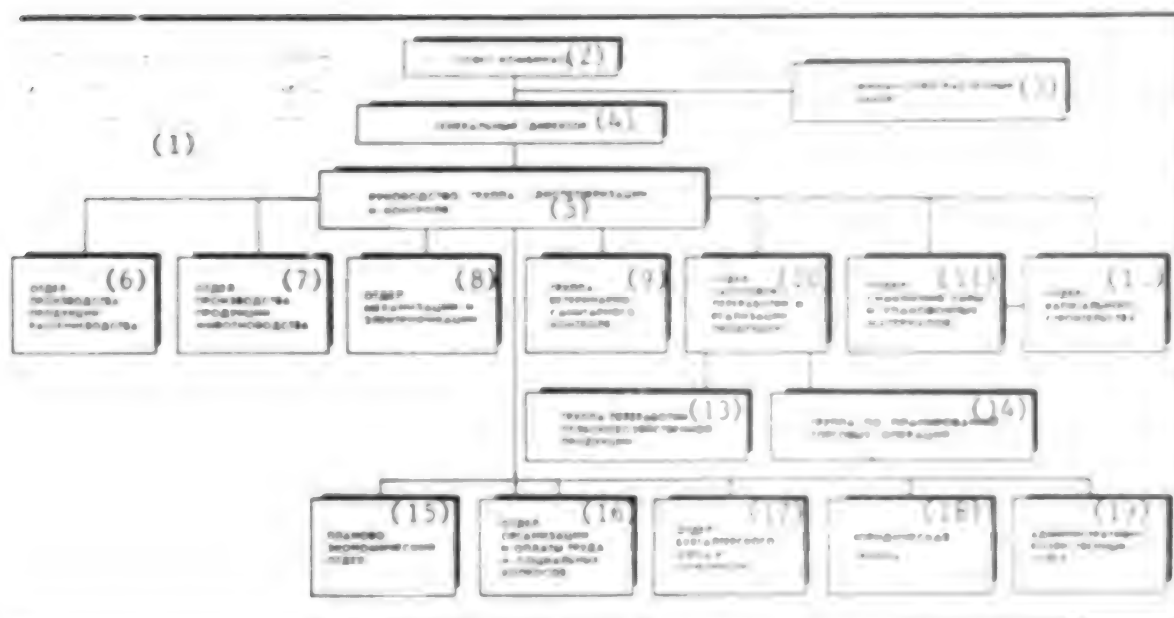
No difficulties are involved in delivering meat products to stores of the Kuban APK. For example, Store No. 8 in Novorossiysk, which we visited, receives two deliveries of meat products each week. True, the head of the store, Mikhail Ivanovich Kutskiy, has complained that his requests for sausage products are not being satisfied fully. But, as mentioned above, the reason for this is well known -- a shortage of raw material resources and processing capabilities.

In order to increase the availability of food goods at the combine, the purchasing of surplus products from the population has been organized. Thus, last year purchases were made as follows: 1,300 tons of meat, 1,600 tons of vegetables, fruit and grapes and 800 tons of milk. This year, according to the combine's specialists, the purchase volumes for these products will be further increased.

The situation with regard to supplying Kuban APK stores in cities along the Black Sea coast with fruit and vegetable products is considerably more complicated. Yes and not only the deliveries but also the sales. Here is what we were told by the chief of Store No. 8 in Novorossiysk and the director of the Novorossiysk branch of a retail trade association Ivan Vasilyevich Skrylnikov.

According to them, the procurement office of the Kuban APK in Timashevsk is a reliable supplier. A store receives a good assortment of fruit and vegetable products from it. On the other hand, vehicles from kolkhozes arrive carrying only one type of vegetable. Naturally, difficulties arise in connection with their storage, since the store does not have the required number of refrigeration storage units, and also with their sale, since the products lose their marketable appearance.

In discussions held with us, the trade workers directed special attention to the transporting of tomatoes. For example, they are transported to a store in Novorossiysk over a distance of 220 kilometers from farms belonging to the agroindustrial combine (city of Timashevsk). This involves an increase in transport expenditures and a deterioration in the quality of the products. Two variants have been proposed for solving this problem. The first -- to include in the structure of the agroindustrial combine several vegetable growing farms which are located in the zone of the Black Sea coastline of Krasnodar Kray and in the immediate proximity of stores belonging to its trade network.



# Key:

1. Administrative structure of the Kuban Agroindustrial Combine
2. Combine Council
3. Financial-Accounting Center
4. General director
5. Management, Dispatching and Control Group
6. Department for Production of Field Crop Husbandry Products
7. Department for Production of Animal Husbandry Products
8. Department for Mechanization and Electrification
9. Group for Veterinary and Sanitary Control
10. Department for Procurement, Processing and Sale of Products
11. Department for Supply of Packing and Packaging Materials
12. Department of Capital Construction
13. Group for Processing of Agricultural Products
14. Group for Planning of Trade Operations
15. Economic Planning Department
16. Department for Labor Organization and Wages and Social Problems
17. Department for bookkeeping and Accounting
18. Legal Group
19. Administrative-Economic Department

The second variant consists of creating intermediate bases in the branches of the combine's retail trade association (on the order of accumulation centers). This requires an efficiently organized network: refrigeration units deliver the products to an intermediate base, which has cooler capacities at its disposal. Subsequently, following sorting, packaging and so forth, the products are shipped to stores.

The leaders and specialists must decide which of these variants is the best one.

Today the enterprises of the Kuban Combine are producing approximately 30 types of sausage products and smoked foods, 14 varieties of canned vegetables, ice cream, non-alcoholic beverages and bakery products. The consumers have given their approval regarding the assortment and quality of these products. But what about the price level?

From the statute governing the Kuban APK's operations:

The sale of the agricultural and industrial products produced by enterprises and organizations included in the combine's structure to the all-union and republic funds is carried out in conformity with the planned tasks and on the basis of approved state prices and sales carried out through the combine's own trade network, at market or to other consumers -- at prices established by the combine's council, with the quality of the products, their packaging and consumer demand all being taken into account. Moreover, the prices established by the combine's council must cover the expenses for the production, storage, processing and transporting of the products and they must also ensure the required savings.

Let us compare the retail prices for certain types of food goods sold through the trade network of the Kuban Combine against the Krasnodar market prices (in rubles per kilogram).

	Kuban APK Prices	Market Prices
Beef of 1st grade quality	3.50	5.00
Pork of 1st grade quality	2.70	4.00
Vegetable oil	1.70	3.00
Fresh tomatoes (August)	0.26	1.00
Cabbage	0.10	0.80
Apples (August - September)	0.30	1.50
Pears (August)	0.60	3.00

If we compare the Kuban APK prices for smoked sausage products against the commission trade prices, then as a rule this comparison once again favors the agroindustrial combine. These prices are higher than those in the state trade. And as emphasized by A. Larin, the chief task consists of lowering the production costs for the products being produced and undergoing processing. The principles of self-support can be achieved not by raising the retail prices but rather by reducing unnecessary expenditures in all of the technological elements.

#### A Current Account in the Combine's Bank

The Financial Accounting Center (a type of APK production bank) is a structural element of the combine. With its creation, all economic and financial work was basically organized anew.

The statute on the Kuban APK reads as follows:

In the established manner, the combine opens up current and other accounts in the USSR Gosbank institute which services it.

Enterprises and organizations included in the combine's structure open up current accounts in the combine's Financial Accounting Center.

"Our internal production bank, or the PKTs [finansovo-raschetnyy tsentr; financial accounting center/ as we refer to it, does not have any monetary



symbols" stated the deputy chief of the Financial Accounting Center Valentina Vasilyevna Bochkova as she commenced our discussion, "The FRTs manages the accounting between enterprises, organizations and farms included in the combine's structure, on withholdings for the centralized funds and other operations, by means of appropriate entries in the current accounts opened in our center."

"The enterprises and organizations obtain cash from the combine's account at USSR Gosbank based upon documents issued by the FRTs" explained the chief of the Financial-Crediting Department Galina Nikolayevna Dubinina.

It must be admitted that initially we were perplexed. Why was the FRTs created and what has been its contribution towards the combine's economy? However, as explained during the course of our discussion, the Financial Accounting Center plays an important role in the production activities of all of the combine's enterprises and subunits. We will begin with the fact that the Kuban APK contributes 15 percent of its profit to the state budget. Moreover, the amount due consists of a sum that is differentiated for each farm, while taking into account the income tax paid earlier and the profit obtained.

Subsequently the Financial Accounting Center issues incentives to the farms for the availability of internal resources in their current accounts. Towards this end, an additional fixed percentage is deducted from these funds. This fine measure is aimed at strengthening the financial status of the farms.

During the operation of the FRTs, the loan indebtedness of the combine declined from 62 million rubles (on 1 October 1985) to 18 million (on 1 October of this year). The savings from the payment of percentages amounted to 700,000 rubles.

There are also other figures which serve to describe the work of the Financial Accounting Center. For example, the proportion of credits in the combine's working capital declined from 35 to 8.7 percent. The turnover rate for short term credit increased by 48 days and for working capital (for the first 6 months of 1986 compared to the same period for 1985) -- by 62.2 days.

Workers attached to the Financial Accounting Center prepare and present to the combine's council draft estimates for the maintenance of its administrative staff and the enterprises and organizations included in the APK structure. They also develop and introduce for approval by the council the system to be followed for the formation and use of centralized funds.

The production activities of the Kuban Agroindustrial Combine are very diverse and rich with various types of innovations. In this complicated economy, it is not a simple matter to adjust the entire economic mechanism.

"In order to reveal fully the potential of the experimental conditions of management" stated the combine's general director, "the difficulties which arise must not be further complicated, but rather they should be eliminated as rapidly as possible. If this is not done, the experiment may be bogged down by various restrictions and thus the planned goal will not be achieved. First of all, the personnel must possess good economic knowledge and they must be able to find the correct solutions in a timely manner.

One can only agree with the above conclusion. Indeed, the Kuban experience will be employed at other agricultural combines which are under construction at the

present time. Hence a persistent need is arising for using more effective forms for training the leaders and specialists of all levels for carrying out work under the new conditions.

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## MACHINERY, EQUIPMENT

### REPORT ON DISCUSSIONS AT MEETING OF AGRO MACHINERY COLLEGIUM

Moscow IZVESTIYA in Russian 6 Dec 86 p 2

[Article by V. Gavrichkin: "Branch Strategy"]

[Text] Notes from a meeting of the Board of USSR  
Minselkhozmash /Ministry of Tractor and Agricultural  
Machine Building/

The term "state acceptance" was not a major one during the discussion held at this meeting. The question discussed not only by workers from the ministry but also by the leaders of practically all of the production associations and leading enterprises of Minselkhozmash was formulated on a considerably wider basis. The discussion concerned methods for further developing the branch. For today the need for organizing the production of a system of machines for the efficient cultivation of agricultural crops, particularly machines of a high technical level, including their productivity, economic effectiveness and reliability, is considered to be an urgent national economic task.

The powerful base of agricultural machine building is available for solving this task throughout the country. Moreover, this base is developing rather rapidly. Over a period of just 3 years (following the adoption in April 1983 by the CPSU Central Committee and the USSR Council of Ministers of the decree which called for the accelerated equipping of agriculture with new and highly effective equipment), the production of marketable products in the branch increased from 10 to 13 billion rubles. Today, as mentioned quite fairly during the Board's meeting, full use of the existing potential will make it possible to achieve high machine quality and reliability. In complex with other measures, the state acceptance of products must establish a barrier against waste and technological laxity. With the new year, it will be placed in operation at 64 enterprises and encompass roughly one half of the output.

This is a stern but necessary measure. It was by no means an accident that the Minister of Tractor and Agricultural Machine Building A. Yezhevskiy, when discussing the strategic trends for branch development, returned to this subject on more than one occasion.

"You must bear in mind" he warned the leaders of associations and enterprises, "that if you underestimate the need for preparing for state acceptance, the situation could become dramatically more complicated. Low quality products will



not be accepted. They will not! And you will be the losers. Nobody is going to pay money for poor products.

It would seem that the stage devoted to preparing for state acceptance should be characterized by a clear trend directed towards improving the quality indicators for the branch's operations. But the facts indicate otherwise. Over the past 6 months, for example, consumer complaints regarding tractors increased by 11 percent and concerning agricultural machines -- by 10 percent.

For individual enterprises, the figures are even more alarming. The complaints by rural machine operators regarding equipment produced by the Krasnyy Aksay PO /production association/ increased by a factor of 1.5 and by the Krasnoyarsk Combine Plant PO -- by twofold. An increase has also taken place in the flow of complaints concerning products produced by the Chelyabinsk, Kharkov and Pavlodar tractor builders, the Odessapochvomash Association and the plants of other associations.

According to data supplied by machine testing stations of USSR Gosagroprom /State Agroindustrial Committee/, the coefficient of readiness and reliability of one out of every three machines which undergo control testing is lower than that called for in the technical conditions. And this in turn means lower productivity and higher expenses for servicing and repairs. During the operation of equipment, massive defects are observed in connection with welded joints, assembly work, adjustments and painting. It can be stated directly: with state inspection, machines containing such flaws will not be allowed to pass beyond the gates of a plant.

This is understook by all enterprise leaders. But by no means is each individual drawing the correct conclusions. Instead of organizing strict input control, adhering to the GOST's /state standards/ and technical documentation and keeping order throughout the entire technological chain, to include each working position and each executive agent, many are still attempting to find alternate routes. In particular, the general director of the Kirovograd Krasnaya Zvezda PO, V. Zheltobryukh, stated with alarm:

"If on 1 January all products were turned over at once for state acceptance, I would be at a loss as to what to do. I propose that schedules be established for converting each type of machine separately over to state acceptance."

Some other speakers attempted to express their hopes for a different type of indulgence. The minister was forced to ask those participating in the meeting not to amuse themselves with hopes and not to waste time with meaningless discussions, but rather to examine more thoroughly the experience of enterprises which are turning over products to state controllers.

"We have been turning machines over to state inspectors for a month now and it can be said that the situation is returning to normal. But indeed, we prepared for this over a period of 3 months" stated the general director of the Tselinogradselmash PO M. Butenko, "Unfortunately, we are still troubled by sluggish reflection and by the habit of using old and obsolete methods. Even in the ministry proper. Judge for yourself: in the new equipment plan for next year, for example, 14 machines were forced upon us for which there was no technical documentation."

There are many problems. This includes "unnecessary" GOST's which do nothing to improve quality and at times even prevent such improvements from being carried out, chronic shortages of control-measurement instruments and unreliable work by allied workers. But in the long line of such problems, the principal one continues to be the overall status of affairs in agricultural machine building.

State acceptance is by no means an end in itself. In the opinion of the 1st deputy chairman of Gosstandart /State Committee for Standards of the USSR Council of Ministers/ B. Sokolov, the quality problem will not be solved if all attention is concentrated only upon the turning over of finished products. Correct decisions must be handed down during the initial stages in the interest of preventing waste, a low culture of manufacturing and so forth. Thus the center of work must be shifted to the early stage -- design developments and converting over to series production. Reliability and quality are implanted during planning and never during production. It is wrong for us to identify quality only with a lack of waste during production. Quality is realized in the productivity of a machine and in its service life and reliability. And production never adds this quality; it can only ensure it. Quality is born on the design boards and in laboratories. And if not here, then it cannot be found anywhere.

This was easy to understand based upon the hall's reaction to these words: they very clearly and accurately expressed a painful aspect of modern agricultural machine building. Some thought should be given to the following figures: over the past 3 years, the schedules for the development of 15 types of agricultural equipment were disrupted by the ministry's enterprises and institutes and 37 more types never reached the plant production line. In essence, the carrying out of the task for the development and production of machines for intensive technologies, to be used in the production of agricultural products, was disrupted.

And we recall the countless complaints by rural machine operators regarding the low consumer properties of the machines. Many of them were heavy, of low productivity and characterized by unreliable operation. Only 30 percent of the machines produced met the standards for the international technical level. In the creation of new equipment, use was not made of many long-recognized designer "instruments." We still do not have tractors which can shift gears while moving with no disruption in the flow of power. There are no systems for motor vehicle operation or for automatically selecting an operating regime and we also lack comfortable unitized cabins and bases of unitized construction. Very limited use is being made of hydraulics. Even in the case of the new Don-1500 combine, all of the kinematics are predicated upon the use of the notorious belts and circuits -- a type of complicated and unreliable spider-web system.

All of this constitutes payment for having failed, over a period of many years, to attach proper value to scientific-technical studies and to the development of the design base. It is only rarely that a KB /design bureau/ is equipped with SAPR's or modern computer equipment and quite often it is unable to obtain test stands. And in the absence of such means, any design development is doomed to having to follow an agonizingly long path from culmination to series production.

True, it was mentioned during the meeting of the Board that not 8 but rather 10-12 percent of the capital investments are presently being allocated for the development of NII's /scientific research institutes/ and KB's. But it is believed that if we take into account the lag that has developed, even this figure is inadequate.

For a long period of time, the designers blamed the low technical level of the machines upon a shortage of high-strength grades of steel, rolled metal profiles and other progressive materials. Truly, Minchermet /Ministry of Ferrous Metallurgy/, Minneftekhimprom /Ministry of the Petroleum Refining and Petrochemical Industry/, Minkhimprom /Ministry of the Chemical Industry/ and some other ministries are under an obligation to the agricultural machine builders. But the situation is changing. That which was dreamed about yesterday, can now be realized either today or tomorrow. And what has happened? It turns out that not even the machine builders were prepared for such a development. The designers are only timidly using progressive materials in the new machines. At a large number of enterprises, for example, closed welded profiles made out of alloyed steel have still not been introduced into production operations. This step alone could raise the reliability of the machines and save the branch tens of thousands of tons of rolled ferrous metal.

The technical re-equipping of production and the creation of new and the modernization of existing capabilities are proceeding more slowly than desired. The supplies of uninstalled equipment, including automatic lines and robot complexes, exceed the norms to some degree. At the Rostselmash PO /production association/ alone, 296 million rubles worth of equipment has accumulated.

It is clear that resolute methods, by means of which and by force of habit an attempt is being made to advance scientific-technical progress throughout the branch, are not producing results. During the discussion, the thought was expressed that the time is at hand for relying upon economic methods of administration. Unfortunately however, no specific recommendations were made and thus this important discussion was not further developed.

In a report and during many speeches made during the Board's meeting, the term "strengthening process" was heard on more than one occasion -- here we have in mind methods for working parts which make it possible to increase their durability to a considerable degree. But a comparison springs to mind: the process involved in today's reorganization of the branch's operations is indeed itself a type of strengthening process, in the absence of which it would be impossible to solve the new tasks. And they are considerable.

It is sufficient to state that by 1990 the branch must organize the production of 386 types of new and modernized machines, increase sharply the motor potential and raise the reliability of a majority of the machines by a factor of 5-8. No less than 80 percent of the equipment being produced must be on a par with the best international models in terms of quality. In the process, the machine builders will supply the rural areas with complexes of machines for use with intensive technologies rather than with individual types of equipment.

A great deal has been accomplished in this regard and more is being carried out at the present time. Good design, technical, technological and organizational reserves are available. In particular, support for the initiative being

displayed by the machine builders in creating a network of enterprises for pre-sale services and firm repair work, at a number of plants of the former Selkhoztekhnika, is deserving of attention. Together with USSR Gosagroprom, the machine builders are presently working on the problem of joint cooperative production of machines suitable for the conditions found in various zones throughout the country.

Whereas new methods for working metals are needed for strengthening the technological processes, work and more work is required for the branch's organizational process. The machine builders already have an all-round program for radical modernization. The task now consists of carrying it out in a persistent manner.

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## MACHINERY, EQUIPMENT

### IMPROVED EQUIPMENT URGED FOR FURTHER AGRICULTURAL DEVELOPMENT

March SOTSIALISTICHESKAYA INDUSTRIYA Article

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Mar 86 p 2

[Article by Yu. Bystrakov, doctor of economic sciences and G. Mastepanova, Candidate of Economic Sciences: "Equipment for Agroprom"]

[Text] Moscow--Land is one of the most valuable elements of our capital. Concern for agricultural productivity requires a different attitude towards it. Why has this problem appeared at this time? Let us examine this matter.

Our overall land area exceeds 2 billion hectares -- somewhat more than 8 hectares per inhabitant. But if we take into account the land in the permafrost zone, swamps and solonetz soil, mountains and deserts, forests and areas occupied by cities, plants, quarries and roads, then the agricultural land remaining amounts to not more than 550 million hectares and the arable land is only half this amount. There is less than 1 hectare per capita.

Is this figure large or small? According to computations, 0.27-0.33 hectares per capita is sufficient for maintaining our lives in keeping with the modern level of farming development and the consumption of products. It would appear that there is no cause for alarm: we still have almost a twofold reserve. But this is not so.

Let us compare the two largest agrarian states -- the USSR and the U.S.A. Thus the northern border of the principal American farming zone passes considerably to the south of our most favorable zone. We will show the importance of this by citing just two facts. In regions where the growing season is 170 days long, 15 percent of our arable land is located and in the U.S.A. -- 70 percent. Four out of every 10 hectares of our productive land is located in areas where the precipitation is less than the minimal norm. In the U.S.A., only one out of every 10 hectares of arable land is located in such regions -- less by a factor of four. Our fields lack both sun and moisture. Thus we cultivate a different and more impoverished grouping of farming products.

Then are we to resign ourselves to this set of conditions? No, there are three main paths that we can follow. The first -- the breeding of plant varieties which will furnish high yields under extreme conditions and especially under drought conditions. The plant breeders are presently creating an average of more than 100 such varieties annually. The second path -- improving the land and raising its potential, through the hands of man, in those areas overlooked



by nature. A chief concern here is the draining of waterlogged land and the irrigation of land subject to drought conditions. And the third path -- equipping agriculture with reliable and efficient types of equipment. And it is mainly the machine builders who are called upon to solve the task assigned during the 27th Party Congress -- to develop the logistical base of the agro-industrial complex in a consistent manner.

Since 1966, the fixed productive capital of agriculture has increased by a factor of 4.5. Moreover, this growth has been especially rapid during the past two five-year plans: the rates turned out to be higher than those for industry.

It would seem that there is some reason to be proud. Moreover, there would also appear to be some basis for expecting corresponding increases in agricultural output. However, statistics reveal that the return from this flow of equipment is considerably less than that expected. Why?

First (and it bears mentioning that this factor is pointed out by industrial workers), there is the unskilful utilization of new machines. It frequently happens that even well made machines break down rapidly as a result of poor operation. Even more often they are operated at one half or one third of their capability. For example, in the Kuban region the pool of powerful tractors increased by a factor of four over a period of two five-year plans and yet the number of days they were used during the year declined from 208 to 151, that is, a decline by a factor of almost 1.4. Beyond any doubt, this was the result of unskilful use of equipment.

But let us not be too quick with our conclusions. There is still another file of data.

Even if the equipment is in good working order, one out of every five, and according to some measurements, one out of every four hours of shift time must be spent merely for carrying out technical maintenance on the tractors. The picture is even more depressing in the case of servicing grain harvesting combines: for each hour of efficient work, one half hour of servicing is required.

As economists, we are unable to give advice as to how best to treat this disease of agricultural equipment. But we can and must furnish an economic diagnosis: the productivity of modern agricultural machines is limited to a substantial degree by the short-term nature of their useful operation. Idle time during plowing work caused by breakdowns and the need for repairs consumes one third of the working time and during harvest operations -- one half. And why is it that the work stoppages in order to correct breakdowns are so long of duration?

This is very apparent in the servicing of machines: the specialists attached to engineering services have time only for one out of every four farms in the rural areas and one out of every two tractors. The kolkhozes and sovkhes are forced into having to repair themselves more than one third of the tractors and grain harvesting combines and 45 of every 100 motor vehicles that breakdown. And their schedule for the carrying out of restorative work is greater by a

factor of 3-4, not to mention the quality of the work which leaves a great deal to be desired. This is a problem for the agroproms /agro-industrial committees/; if they don't solve it, nobody will.

The second cause -- a lack of spare parts. But a shortage of spare parts for a particular repair operation does not necessarily mean that such parts are not being produced in sufficient numbers. There have been many articles in the press which have touched upon the problems concerned with the planning, production and distribution of these products. We would like to direct attention to another aspect of the problem: it is our opinion that the agricultural equipment must be of such quality that fewer spare parts are required during the course of their operation than are being used at the present time.

The proportion of agricultural machines awarded the State Badge of Quality is still quite low -- not more than 15 percent. Moreover, their reliability is especially unsatisfactory. For example, the service life of tractors, which formerly was 20 years, is now only 10 years.

It is not our intention to make this parameter absolute. But we cannot ignore its economic consequences. And they are as follows: over the past 40 years the country's tractor production has increased by a factor of 18 and the overall capability of their engines -- by a factor of 30. But it was not possible to equip all of the kolkhozes and sovkhoses with these machines. With respect to the annual delivery to the rural areas of an armada of tractors, only six out of every 100 actually augment the pool of machines. The remainder serve as replacements for machines written off.

This problem was examined by a special working group created by the USSR State Committee for Science and Engineering. Experts drew the conclusion that the methods being employed for developing the service norms for agricultural equipment are not in keeping with the modern requirements. It is the responsibility of economists attached to many ministries and departments to draw conclusions from this conclusion. But realistic results will be obtained more rapidly if the organizers of this work act in a persistent manner. It is our opinion that specialists attached to the Scientific Research Institute for Planning and Norms of USSR Gosplan must make their feelings known.

The fact that 300,000 tractors, 90,000 grain harvesting combines and many other items of equipment are being written off annually cannot be justified on the basis of their quality at the present time. Earlier there was some compulsion to do this based upon the fact that amortization deductions continued to be made for machines the service life of which had expired. It was more convenient and less troublesome for the owners of the equipment to turn the machines over for scrap purposes and to obtain new ones. Today such deductions have been discontinued. But this is having little effect on the writing off of equipment. It is obvious that an individual farm has little to gain from extending the service life of its equipment.

It is believed that during the course of searching for incentives the agro-industrial associations should intensify their propaganda and organizational work. Indeed, an increase in the service life of these same tractors, if only

for a year or two, represents a savings of roughly 140,000 tons of metal. And the chief consideration is the fact that it will be possible to equip the kolkhozes and sovkhoses completely with tractors by the end of the current five-year plan.

However paradoxical it may sound, today the agroprom requires something more than just highly productive machines. The designers are striving to raise the power ratings of the equipment. This is certainly correct. But at the same time, they are increasing the weight of the equipment. And this is certainly a mistake; a post-plow pillow forms which seriously inhibits the development of the plants. In short, a designer of new equipment and machines must focus attention not only on their technical characteristics but in addition he must take into account the properties of the ground on which they will be operated.

Regardless of the urgent nature of the agroprom equipment problems we choose to examine, economic analysis invariably forces the conclusion: today the bottlenecks can be corrected successfully using measures which do not require long-term or large capital investments. The enterprise of leaders and the initiative of collectives, plus a more flexible planning and price mechanism -- we consider these to be major considerations in light of the achieved level of logistical equipping of agriculture.

#### October PRAVDA Article

Moscow PRAVDA in Russian 17 Oct 86 p 1

[Unattributed article: For Agroprom--A Complex of Machines]

[Text] During the 27th CPSU Congress, mention was made of the need for a decisive change in the agrarian sector so as to bring about an improvement, during the 12th Five-Year Plan, in the work of supplying the population with food goods and industry with raw materials. The means for achieving this goal -- consistent strengthening of the logistical base of the agroindustrial complex, harmonious development of its branches, efficient utilization of the achievements of scientific-technical progress and the elimination of bottlenecks -- from the production of goods to their sale to the consumer.

In solving this task, it is difficult to exaggerate the role played by the machine builders. In recent years, they have improved the equipping of kolkhozes and sovkhoses with machines and spare parts. More resources are being allocated for strengthening food supply machine building and for the construction of processing enterprises. But in order to improve all-round mechanization in the production of the principal agricultural crops and animal husbandry processes, industry must double its efforts and carry out in a purposeful manner the re-equipping of agriculture and its associated branches.

During this current five-year plan, the collectives of enterprises must accelerate the production and deliveries of complexes of machines for the cultivation of grain and forage crops, cotton, sugar beets and potatoes using intensive technologies. In creating such equipment, more complete use must be made of the more progressive trends in scientific-technical progress: modular principles for the construction of agricultural units, automation and control



equipment, hydraulic drives and other modern technical solutions which make it possible to employ production line work organization and to introduce new technological processes. For example, farmers require multiple-purpose units and technical equipment for replacing manual labor or for sharply reducing the proportion of such labor. Farms and processing enterprises must be supplied with considerable quantities of new equipment for mastering resource-conserving technologies and completed technological lines.

The machine builders do not have time for carrying out their work in a slow manner. This is particularly true in view of the degree to which they have become obligated to the rural areas in past years. For example, during the past five-year plan the enterprises of Minselkhoz mash /Ministry of Tractor and Agricultural Machine Building/ and Minzhiv mash /Ministry of Machine Building for Animal Husbandry and Fodder Production/ supplied the production lines with only one third of the new machines. Yes and these at times were produced in small series -- less than 1,000 units. Serious complaints have been lodged against the technical level and quality of these machines. Quite often the machine operators must carry out work in their repair workshops aimed at correcting flaws which developed at the plants during the production of the equipment.

An alarm has been sounded in the many letters sent in to the Editorial Board of Pravda by rural specialists and workers attached to agro-industrial associations: why are machine complexes for vegetable, fruit and root crop production being created so slowly? Meanwhile, it is for this reason that 35 percent of all labor expenditures in field crop husbandry is for cotton, sugar beets, vegetables, grapes, potatoes and food roots, which occupy only one tenth of the arable land. The K-700 and T-150K tractors have been in production for approximately 20 years and yet they are still not equipped with sets of towing or attachable implements. There is clearly a shortage of those machines required for introducing intensive technologies into operations. Only small quantities of the equipment needed by farms are being produced. As a result, the proportion of non-mechanized operations and manual labor is extremely high.

The creators of new equipment are quite familiar with the requirement of the April (1985) Plenum of the CPSU Central Committee: to convert over rapidly to the production of new generations of machines and equipment. However, this process is still proceeding at a slow rate. In the nomenclature for enterprises of Minselkhoz mash, for example, more than one half of the machines are obsolete and in the case of Minzhiv mash -- more than 30 percent. Perhaps, there are no replacements for this equipment. This cannot be said. There are many machines which have successfully undergone testing and been recommended for production, machines which for years have not been assigned to production lines. The guilty parties in this situation only shrug their shoulders helplessly: what is to be done?

An analysis conducted last year by a committee of the USSR State Committee for Science and Engineering revealed that a considerable number of the machines produced by enterprises of Minselkhoz mash and Minzhiv mash do not conform to the

international level. The quality of many tractors is low. Is it not time to ask the branch's leaders and the party committees of ministries and enterprises: why was it that not one newly designed tractor reached a production line during the years of the 10th and 11th five-year plans, despite the fact that the DT-175S, MTZ-100/102 and MTZ-142 machines were tested and recommended for production during this period? The modernization of old tractors, which was carried out throughout the branch, did not improve substantially their technical-economic indicators. There is still another disturbing factor: over a long period of years, the design and scientific-research organizations did not introduce any noticeable changes into the design for plows aimed at lowering power consumption for plowing, reducing fuel consumption or raising the durability of plowshares.

The low quality of many machines, a shortage of machine operators in the rural areas and the absence of repair workshops on some farms precluded the possibility of achieving the tremendous potential embodied in the equipment. According to data supplied by machine testing stations, the coefficient of readiness and reliability for one out of every three machines which underwent control testing was lower than that called for in the technical conditions. And in turn this means lower productivity and higher expenses for servicing and repair work. It bears mentioning that the USSR Gosagroprom /State Agroindustrial Committee/ expenses for these purposes have already reached 7 billion rubles. And indeed an increase in the reliability of equipment produced for the rural areas only up to the norm would aid in reducing the expenditures of kolkhozes and sovkhoses for the repair and technical servicing of machines by 2 billion rubles annually and it would make approximately 300,000 workers in this sphere available for other work.

The scientific-research institutes are exerting only a weak influence with regard to implementing equipment improvements. The contribution by some institutes is so small that it is difficult to notice it. Proper exactingness is not being displayed at some machine testing stations with regard to the technical level of the machines. What will this lead to? It will result in the production line turning out technically deficient machines, the correction of which during the course of production operations will turn out to be very costly.

The party committees of ministries, departments and enterprises must undertake all possible measures aimed at accelerating the rates for the creation of new machines and equipment, to be used mainly for introducing intensive and industrial energy and resource-conserving technologies into operations and for reducing and replacing manual labor in the field and on farms. A complex of machines which will make it possible to raise labor productivity considerably, to ensure production line work in the carrying out of agrotechnical operations and to increase the return from resources invested in the development of equipment for the rural areas must be created and produced in a more rapid manner. Such a task lies within the capability of the machine builders and they must cope with it successfully.

## TILLING, CROPPING TECHNOLOGY

### INTENSIVE TECHNOLOGIES FOR GRAIN PRODUCTION EXTOLLED

#### Mistakes, Problems, Results

Moscow ZEMNOVOYE KHOZYAYSTVO in Russian No 11, Nov 86 pp 2-6

[Article by Yu. Kovyryalov: "Intensive Technologies: Results, Mistakes, Problems"]

[Text] The grain problem continues to be a key task within the food complex. To a decisive degree, it determines the success to be achieved in carrying out the task assigned by the 27th Party Congress -- satisfying fully the country's requirements for food goods within a brief period of time.

Over the past few years, the party and government have been carrying out large-scale measures aimed at strengthening this important branch of the national economy. The logistical base is being improved and intensive technologies for the cultivation of grain crops, the collective contract and cost accounting principles are being employed extensively and this is promoting farming intensification to a considerable degree. However, the gross yields of grain, especially wheat, declined during the past five-year plan.

In this regard, all possible measures are being taken at the present time in the interest of correcting the existing situation.

In view of the great importance attached to rapidly increasing grain production, the CPSU Central Committee and the USSR Council of Ministers adopted a special decree entitled "Measures for Raising the Stability of the Country's Grain Economy and Increasing Grain Forage Resources During the 12th Five-Year Plan."

The task of achieving stability in grain production requires a search for and the implementation of new and realistic means and methods for raising efficiency, the use of scientific achievements and leading experience, growth in the initiative of personnel at all levels of the economic mechanism and concentrated effort in all elements of the agroindustrial complex.

Let us look at some examples. The comparatively favorable natural conditions found in the Baltic and Belorussian regions, a high production potential and the experience of leading farms are making it possible to develop this important branch in a dynamic manner. It was not too long ago that such dynamic action was achieved in actual operating practice. For example, during the 9th Five-Year Plan and compared to the 7th, the grain yield in Belorussia was raised from

8.4 to 21.3 quintals per hectare. Roughly the same rates of growth prevailed in the Baltic republics. However, more recently, despite rapid growth in fixed capital and the mineral fertilizer norm, grain production has appeared to be marking time. As a result, during the 11th Five-Year Plan Belorussia fell short of its grain plan by almost 4 million tons, Lithuania -- by more than 1 million, Latvia -- by more than 2 million and Estonia -- by 600,000 tons.

In the Ukraine and Moldavia, over the past 15 years, the grain productivity has remained unchanged despite the increasing logistical and biological potential. Moreover, during the past five-year plan it turned out to be lower than the 1971-1975 level in almost one half of the oblasts in the Ukraine, including in Crimea Oblast -- by 2.2, Kirovograd -- by 3.2, Nikolayev -- by 4.1 and Odessa -- by 4.6 quintals per hectare.

The grain crop sowing areas were also reduced in size. All of this led to a situation wherein, during the 11th Five-Year Plan, the average annual gross yield of grain throughout the Ukraine on the whole declined by 3.8 million tons and in Moldavia -- by 380,000 tons. During these years, the total amount of indebtedness to the state at kolkhozes and sovkhoses in the Ukrainian SSR, in terms of grain purchases, amounted to 26.6 million tons and in the Moldavian SSR -- 545,000 tons. During the 10th Five-Year Plan, the Ukrainian SSR fulfilled its grain purchase plan only twice (in 1977 and 1978) and during the 11th Five-Year Plan -- not once.

The Ukraine, which produces more than one fifth of the country's overall grain harvest, ceased satisfying its own requirements for this product. During the years of the 11th Five-Year Plan, 23.3 million tons of bread and forage grain were imported here.

Beyond any doubt, the slump in the indicators conforms directly and accurately to the decline noted in the culture of farming and in the level of management. This applies not only to the quantitative but also the qualitative characteristics of an ear of grain.

Let us turn to the practice of grain economy management in Orenburg Oblast. This region is one of a very few areas on the planet where, owing to bio-climatic conditions, high quality wheat can be grown, particularly durum wheats suitable in particular for the preparation of macaroni.

Several years ago, during the course of searching for easier methods for increasing the gross yields of grain, the oblast began limiting the durum wheat sowings. As a result, in 1984 only 600 tons of first class durum wheat grain were delivered to the state's granaries.

It is to the credit of the Orenburg farmers: durum wheats were sown this past spring on 550,000 hectares, compared to only 350,000 hectares 2 years ago.

Similar situations have been noted in other regions of the country. Understandably, it is not an easy matter to raise grain production to the new positions and yet this work must be carried out as rapidly as possible.

The new economic situation in the rural areas, measures adopted for improving the management mechanism in the agroindustrial complex, the introduction of

stable grain purchasing plans, effective incentives for above-plan sales and the development of initiative and independence on the farms are creating the prerequisites needed for the above.

A most important method for solving the grain problem is the development of zonal farming systems in all areas and particularly the chief element of such systems -- intensive technologies for the cultivation of grain crops.

Some results. The intensive technologies are opening up truly inexhaustible reserves.

This year, the use of these technologies for the cultivation of winter wheat in Krasnodar Kray made it possible to increase the average yield to 45.6 quintals per hectare over an area of 1.3 million hectares and to obtain an increase in grain of 9.8 quintals per hectare.

"Never before have we obtained such grain" commented the team leader of a harvesting-transport team at the Put Lenina Kolkhoz in Peschanokopskiy Rayon in Rostov Oblast, member of the CPSU Central Committee and Hero of Socialist Labor N. Pereverzeva, "I cannot remember having obtained 60 quintals per hectare. And yet this was the amount furnished by the fallow fields. Believe it or not, but use of the intensive technology allowed us to feel for the very first time that we are expert grain growers and that we can obtain very high yields. Our personnel, those who believed in the intensive technology, achieved such remarkable results."

At the Voskhod Kolkhoz in Khokhol'skiy Rayon in Voronezh Oblast, a yield of 33.5 quintals of grain per hectare was obtained from 1,150 hectares of winter crops, a figure that was considerably higher than the average indicator for the oblast. When tracts sown using the intensive technology were included, the yield amounted to 43.8 quintals. Hectares having a permanent technological track were especially generous: an average of 53 quintals of grain per hectare was obtained from these fields.

"Compared to last year, when 1,500 hectares of wheat were cultivated using intensive methods" noted the 1st secretary of the Khokhol'skiy Rayon Party Committee I. Medvedev, "this year -- 8,500 hectares. I am convinced that the new technology enabled the crops to survive the summer drought conditions and it also made it possible for the farms to obtain a good harvest."

Not only the rayon as a whole, as we are accustomed to stating in our summaries, but each of its 20 kolkhozes fulfilled its grain sales plan. Khokhol'skiy Rayon shipped approximately 37,000 tons of wheat to the receiving points, of which amount 19,000 tons were of the strong and valuable grades.

I would like to direct special attention to this particular feature: strong and valuable wheats have finally made an appearance on farms in the central chernozem zone. For example, the farmers in Voronezh Oblast obtained and turned over more than 200,000 tons. The same holds true for Lipetsk and Belgorod oblasts -- the farms are now obtaining high quality grain for the second autumn period and the volumes are increasing.



As a result of the extensive mastering of intensive technologies in Belorussia, 85 farms have now obtained an average of more than 40 quintals of grain per hectare and 11 farms -- more than 50 quintals. Moreover, the Progress Kolkhoz in Grodnenskiy Rayon is approaching the goal of 60 quintals per hectare. For Nesvizhskiy Rayon in Minsk Oblast on the whole, an average of 40 quintals of grain was obtained per hectare of winter crop sowing. Similar yields are being obtained on leading farms in Lithuania, Latvia and Estonia.

The experience of the Kolkhoz imeni Zhdanov in Melitopolskiy Rayon in Zaporozhye Oblast, where Hero of Socialist Labor Anatoliy Dmitriyevich Zhuravlev has served as the chief agronomist for many years, can serve as a fine example. Despite the extreme drought conditions found in the southern and steppe portion of the Ukraine, stable grain crops yields on the order of 35-42 quintals per hectare are being obtained here annually. This year, on this farm, an average of 40 quintals of grain was obtained from each of 1,024 hectares and winter wheat grown using the intensive technology furnished 56.8 quintals. In those areas where use was made of a technological track, the yield reached 60.8 quintals.

Even better results were achieved at the 40 Rokiv Zhovtnya Kolkhoz in Vasilkovskiy Rayon in Kiev Oblast, which is located in the forest-steppe zone.

"We began using the intensive technology last year" stated the chairman of the kolkhoz N. Sabchuk, "and we obtained 50.1 quintals of wheat grain per hectare from 500 hectares. This year it was cultivated on 1,046 hectares using the new method and each such hectare furnished 57.2 quintals. Compared to the traditional technology, the increase amounted to 20 quintals."

In Stavropol Kray, the intensive technology is being introduced taking into account the zonal conditions. In determining the complex of agrotechnical measures to be employed, special importance is being attached to one particular factor -- the availability of moisture. This is reflected in the differentiated approach being employed by specialists in selecting the soil cultivation methods, determining the predecessor crop arrangements for the winter crops and the methods for combating weeds and defining the norms for sowing and for the use of fertilizers. Unfortunately, the efforts of the kray's grain growers are being negated somewhat by untimely deliveries of mineral fertilizers and by the unsatisfactory ratio for the nutrients contained in them. In particular, a deficit of phosphorus is being experienced in the face of a relative surplus of nitrogen in the soil. This is affecting not only the yields but also the capability of the plants to endure unfavorable weather factors.

Intensification of the grain economy is a most effective method and one which is very accessible to and within the capability of farmers. But the sharp contrasts must not be overlooked. At the Tambov kolkhozes imeni Kalinin and Pamyat Il'icha, which are in Zherdevskiy Rayon, more than 52 quintals of grain were obtained from an intensive hectare. And at the Kolkhoz imeni Dzershinskiy in Rzhaksinskiy Rayon -- 21.5 and at the Druzhba Kolkhoz in Pervomayskiy Rayon -- 23 quintals. The weak return from arable land, which it bears mentioning required one and a half times more expenditures and a great amount of attention, defined the "face" of entire rayons and the overall productivity picture. On the fields of rayons in Voronezh Oblast -- Bogucharskiy, Vorobyevskiy,



Petropavlovskiy, Kantemirovskiy -- the yields did not exceed 8-13 quintals per hectare. And since, in the opinion of the grain growers, the intensive technology makes it possible to protect properly the "face" of the branch even during critical situations, there can be only one conclusion: the technology did not endure in the mentioned rayons; it existed only in the summaries and reports.

Miscalculations. Unfortunately, quite often the intensive technology does not justify the hopes of the leaders and specialists at various levels.

Why? By force of habit, blame is often placed upon the weather, upon the absence of certain resources or materials or upon plant breeding miscalculations. Although initially this would seem to be the case, a closer examination usually reveals many miscalculations and mistakes which are caused directly by the leaders, specialists and machine operators.

Here, for example, is how the leaders of the Khokholskiy RAPO [rayon agro-industrial association] self critically analyzed their own derelictions: the fallow land is still being fertilized in a weak and low quality manner, chemicals were not used effectively when treating the seed or during the plant tillering phase and the crops were not treated against the appearance of pests. These are serious shortcomings. Nevertheless, a yield of 40 quintals of grain per hectare was obtained. What then will be the case at an agronomic farm where one half of this grain fails to develop?

In the practice of organizing grain production, the principle of mandatory concentration of logistical resources is not being observed in all areas. And indeed the intensive technology is first of all a system. It is a system for cultivating the soil, applying fertilizer, employing protective measures and for accurately observing an entire complex of technological operations. At the Bolshevik Kolkhoz in Ordynskiy Rayon, the participants in a Novosibirsk zonal conference were shown demonstration experiments on mastering the intensive technology for spring wheat cultivation. The experiments were conducted by workers attached to the Siberian NIIZKhim. Two fields were located alongside the field on which the entire system of technological operations and agro-technical measures concerned with the intensive technology were carried out: on one of these fields, the Novosibirskaya 67 variety was grown using the traditional technology and on the other -- using the intensive technology, but in the absence of measures aimed at protecting the crops against pests and diseases.

By way of a souvenir and graphic aid, the participants in the seminar were given a sheet of paper with three ears attached to it -- an ear for each of the fields. It was apparent even to a non-specialist that they differed greatly -- in terms of the number of grains in each one and also in terms of the grain volume weight. Just as in a mirror, the three ears reflected the three approaches employed in cultivating the grain crops and the three results realized: approximately 50 quintals of grain were obtained from the first field, 28 from the second and 43 quintals from the third.

Life itself requires the carrying out of radical technological, technical, agrochemical and other measures capable of ensuring a concentration of

production resources. For example, during the autumn of last year, in Belorussia, only 57 percent of the amount of phosphorus fertilizer required was applied in conjunction with the use of intensive technologies, in Lithuania -- 69 and in Latvia one third of the winter crop fields were sown in the absence of row fertilization and in Estonia -- more than one half. Proper attention is not being given to the correct adjustment of the machines. Late and low quality plowing and the absence of a carry-over seed fund for the winter crops are resulting in crop losses over considerable areas.

Each year the kolkhozes and sovkhozes in the Ukraine are having to resow almost one fifth of their winter crop fields. In Kharkov Oblast, 67 percent of the winter crop sowings perished this past spring, Voroshilovgrad -- 48, Poltava -- 50 and in Sumy Oblast -- almost 50 percent.

Violations of the technology are occurring even during the period devoted to tending the crops. Meanwhile, this is not the first year that a dispute has taken place over the feasibility of using a technological track on the grain fields. Intensive with a track or without a track. These two concepts accompany one another in the summaries. It is interesting to note those instances when the leadership, agronomists or machine operators persistently search for methods for raising their yields, either using a track on the entire area or mainly with the use of a track. In those areas where this promising technology has been adopted as the latest modern trend, an entirely different picture prevails.

One often hears it said that a track is a legitimate defect. This is even borne out by certain figures: it is said that a track uses up 7 percent of the sowing area -- and this is unproductive land, such that an increase in yield will not compensate for the loss involved.

In the 22 August 1986 issue of the newspaper SOVETSKAYA ROSSIYA, machine operator V. Dedeshko at the Kolkhoz imeni Sverdlov in Krasnogvardeyskiy Rayon in Stavropol Kray furnished the following evaluation of a technological track: "Here is what is realized from the use of a track: after a triple-sowing unit had made 22-23 circles, it was estimated that 10 hectares had been lost. For a yield of 40 quintals, these hectares could have furnished 40 tons of grain. And if a track furnishes an increase of 4-5 quintals per hectare, where is the gain?"

The technological track does not furnish any increase -- this fact must be understood! Agrotechnical methods -- their completeness, schedules or expertise in employing them -- produce a profit or loss of grain from a field. A permanent track is a means for observing technological discipline on an intensive grain field.

Nevertheless, let us give some thought to how extensive the losses would be if the crops were cultivated without a permanent track. It has been estimated that even a single run over a field by a unit, when the plant height of the plants is more than 40 centimeters, lowers the yield by 4-8 percent. And these losses increase if the runs by units during subsequent cultivations do not coincide with previous ones (and in the absence of a technological track they will never coincide). Moreover, when carrying out agrotechnical methods among crops which are growing, the orientation of machine operators with regard to

observing the distances between individual runs by tractor units becomes more difficult. This often leads to irregular applications of fertilizer, herbicides, fungicides and retardants and it also lowers the yields considerably.

This year, in Krasnodar Kray, a permanent track was employed for the entire one million hectares of winter wheat grown using the intensive method.

Such practice is still not being carried out in Stavropol Kray. Of 900,000 hectares of winter wheat under cultivation here using the intensive technology, a track was employed only on 350,000 hectares.

Meanwhile, figures clearly speak out in favor of the technological track. In Stavropol Kray, each hectare with a track furnished 9.8 more quintals of grain than did an "intensive" hectare which lacked a track.

It is easy to estimate that those who declined to use a permanent technological track sustained a shortfall of one half million tons of grain. The yields themselves speak out in favor of a technological track. In the absence of such a track, there cannot be an intensive technology or stable yields.

Problems... Zonal conferences were held in August -- seminars in Minsk, Krasnodar, Denproptetrovsk and Novosibirsk. The problems concerned with raising the efficiency of the grain economy, intensifying the effect of intensive factors and economic stimuli on branch development and improving the methods for controlling production were examined during these meetings.

A great amount of concern was evidenced during the conferences for sharply improving the work being carried out with land and for improving soil fertility.

It was noted that Belorussia, Lithuania, Latvia and Estonia occupy a leading position in the country in matters concerned with raising the fertility of lands. Here 10.4-14.5 tons of organic fertilizer are being applied per hectare of arable land and the majority of farms have converted over to a 5-year cycle for the liming of acid lands. A self-supporting nutrient balance was actually achieved. As a result, over a period of 20 years the humus content in the soil increased from 1.77 to 2.1 percent.

The Krasnyy Gornyy Sovkhoz in Lipetsk Oblast has been cited as an example. Here the yield for winter wheat, cultivated using the intensive technology, reached an unprecedented indicator for the TsChZ /central chernozem zone/ -- 53.8 quintals per hectare. Compared to the traditional technology, the increase in yield was 15.5 quintals. This was the natural result of a number of factors: the introduction of a scientific system for achieving a nutrient balance in the soil, the use of accurately dosed amounts of organic and mineral fertilizer and the introduction of anti-erosion soil cultivation methods.

However, over the past 15 years the soil in the Ukraine has lost a considerable amount of its humus.

The time is obviously at hand for assigning responsibility for soil fertility in like manner as it has been assigned for the carrying out of production plans -- concern not only for today's but also for tomorrow's harvest must become the law of agronomic practice.

Taking into account local peculiarities, the soil cultivation system must ensure such features as soil protection, moisture accumulation and moisture retention. Towards this end, the machine builders must undertake urgent measures aimed at ensuring that the kolkhozes and sovkhoses are supplied with the necessary equipment. Such a machine system was demonstrated for those who participated in the Denpropetrovsk conference held at the Novomoskovsk Rassvet Kolkhoz. Included in this demonstration were BD-10 disk harrows, a KPSH-9 cultivator, an AKP-2.5 multiple purpose unit, a PTK-9-35 plow with a PVR-3.5 attachment, a Slavutich-8.8 cultivator-combiner, an RZK toothed ripper, the new Paroplav plow system, the PLN-5-36 plow equipped with a deep ripper, the KPSH-5 cultivator-sweep and others. But the participants in the conference displayed special interest in the ShchP-3-70 soil trencher. This tool is as necessary to the farmers as is air. It makes it possible, in the absence of furrow slice inversion, to increase the arable layer by 50-60 centimeters. This promotes increased and more uniform moisture retention and it decreases the runoff of water into micro-depressions, it increases the absorption of water by the soil, it prevents the formation of an icy crust and it produces an increase in yield.

A large number of complaints were registered against the machine builders for their slow mastering and delivery of the machines required for the intensive technologies.

The 1st deputy chairman of the Presidium of the Siberian Branch of VASKhNIL /All-Union Academy of Agricultural Sciences imeni V.I. Lenin/, Academician N. Krasnoshchekov, stated in this regard: "The intensive technologies require basically new equipment. Our research is directed towards creating multiple-operation agricultural machines. I can explain this by citing an example: multiple-purpose units have already made an appearance on the fields in Novosibirsk Oblast. These are unique soil cultivation combines which carry out an entire cycle of pre-sowing operations during just one pass. Only one third of the usual number of tractors is required and other expenditures are also sharply reduced. It is easy to imagine the savings that will ensue from 700,000 hectares of intensive fields this year.

A successful production check has also been carried out on a unit having an entire complex of interchangeable working organs.

Practically all of our units are multiple-operational and can be adjusted for various conditions. In like manner, those who produce the equipment should be able to adjust rapidly to the requirements of the intensive technology."

A considerable amount of work was carried out during the conferences in connection with the training of machine operators and ensuring that these individuals master the intricacies of the new technology. It was noted that this work is being neglected in many rayons in the Ukraine. More than 70 percent of the machine operators have had only 3-4 weeks of course training. This can only have an adverse effect on the fields and in the final analysis on the yields.

Serious attention must be given to the specialists in the farming department -- the agronomists. Life reveals that high and stable yields are always being obtained on those farms where chief agronomists have worked for decades. An example of this -- the Zorya Kommunizmu Kolkhoz in Novoarkhangel'skiy Rayon in



Kirovograd Oblast, where Hero of Socialist Labor and honored republic agronomist Prokofiy Artemovich Pisakov serves as chief of the agronomic service. Here, over the past three five-year plans, the average annual grain yield exceeded 48 quintals per hectare and winter wheat -- 50. The chief agronomist and the machine operators counter the droughts, frosts and other caprices of the weather with high technological and labor discipline. Here the crop rotation plans are being observed in a strict manner, the best methods for tilling the soil and applying fertilizer are being introduced and a shortage of humus is not being tolerated. Each individual is carrying out his tasks in an efficient agronomically correct and scientific manner.

The more an individual loves his work, the better he carries it out and the more he comprehends the wisdom of his selected profession. It is pleasant for an individual to feel that he is a respected and skilled worker and not just somebody who carries out the will of another or decisions which were not properly thought out. But independence of thought and deed and freedom to act result from knowledge and competence -- these are the factors which provide internal freedom and confidence in one's own ability. In addition, they make it possible to manifest the qualities needed by society: the ability to accept responsibility and to be bold and industrious. In introducing intensive technologies, each specialist, economic executive and party and trade union worker must display concern for instilling in their subordinates an interesting approach for achieving the final results of their work.

The mastering of the intensive technologies for cultivating grain crops represents a qualitatively new stage in the development of farming, one which has revealed a great void between the modern level of biological science and engineering and the level of knowledge (even among agronomic and engineering-technical personnel). Quite often, yesterday's knowledge simply is not enough.

Never before in farming practice have all of the production factors -- land, plants, equipment, chemistry and man -- been combined so strongly in one unit. Never before has such systematic use been made of intensification factors in the formation of a harvest.

Thus, during the first stage of personnel retraining a requirement will exist for achieving a psychological reorganization of their work and for overcoming the fear of scientific-intensive biology, engineering and technology through a thorough study of the principles of intensive technologies. Subsequently, there will be a need for accumulating knowledge, practical skills and ability for exerting a skilled influence upon the control over and formation of a harvest. Based upon a crude comparison, it would appear that the intensive technology has imposed upon an agronomist or rural machine operator the same conditions confronting an engineer at an industrial enterprise or a plant worker. This is why, as noted by M.S. Gorbachev during a speech delivered before the party-economic aktiv of Kazakhstan oblasts and krays and oblasts of Siberia and the Urals on 7 September 1985, "personnel competence is considered to be a decisive factor at the present time."

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## Requirements for Expanded Use

Moscow SELSKAYA ZHIZN in Russian 27 Nov 86 p 1

/Editorial article: "The Intensive Fields Beckon"/

/Text/ The workers attached to the agroindustrial complex are summarizing their operational results for the current season, they are laying the foundation for their next harvest and they are undertaking measures directed towards the unconditional fulfillment of the plans for 1987. While attaching proper importance to the results already achieved, we recognize the need for not yielding to slackness or complacency. Up ahead are the new and important tasks advanced during the 27th CPSU Congress. By the end of the five-year plan, grain production must be raised to 250-255 million tons, increases must take place in the quantities of sugar beets, sunflowers, potatoes, vegetables and raw cotton obtained, the quality of the products must be improved and the entire agrarian sector of the economy must be developed in a stable manner. The coming year must be a decisive one with regard to achieving the goals planned. Thus importance is being attached to placing in action the tremendous potential of the country's agroindustrial complex and to actively accelerating the socio-economic processes in the rural areas.

The extensive use of intensive technologies in agricultural production is viewed as being a task of exceptional state importance. The essence of these technologies lies in the carrying out of a complex of mandatory agrotechnical and organizational measures during all stages in the cultivation of grain and other crops. It is precisely on this basis that leading farms are achieving high yields and outstanding product quality and are stabilizing their farming production. Last year, intensive technologies were employed on more than 16 million hectares and they produced definite results: the kolkhozes and sovkhoses obtained 16 million additional tons of grain. This progressive method was used this year for the cultivation of agricultural crops on 31 million hectares. And the increase from each one of them amounted to approximately one ton of grain.

The Kuban farms succeeded in obtaining 45.7 quintals of grain per hectare from their "intensive fields," or 10.3 more quintals than that obtained from sowings carried out using the conventional technology. This enabled the kray to obtain more than 1.3 million additional tons of grain and to compensate fully for the expenditures involved. And the intensive technology produced such results in all areas. At the Pravda Kolkhoz in Mlinovskiy Rayon in Rovno Oblast, winter wheat furnished 74.8 quintals per hectare. This success was based upon the use of a good predecessor crop arrangement, adding sufficient fertilizer to the soil and applying a top dressing to the crops during the growing season using a technological track. The Progress Kolkhoz in Grodnenskiy Rayon obtained 59.1 quintals of wheat and rye from each of 2,700 hectares. Here a special role was played by organic materials and new productive varieties. The farms in Ilishevskiy and Dyurtyulinakiy rayons in the Bashkir ASSR, in Shipunovskiy and Rubtsovskiy rayons in the Altay Kray and many other kolkhozes and sovkhoses throughout the country achieved fine increases in their yields.

The leaders and specialists of farms, agroproms /agro-industrial committees/ and party organizations and all APK /agroindustrial complex/ workers are under

an obligation to consolidate and surpass the results already achieved and to realize further increases in the production and procurements of all types of agricultural products and raw materials. During the current five-year plan, the plans call for the areas of grain crops cultivated using intensive technologies to be increased to 50.4 million hectares, including next year -- to 36 million hectares. With only a 10 quintal increase in yield per hectare, it is easy to imagine how much additional grain can be produced on the basis of this factor alone. As emphasized in party documents, intensification in the agrarian sector is a main operational trend and one which requires a concentration of logistical resources in the interest of achieving maximum increases in the yields of products.

In preparing for the future harvest, special importance is being attached at the present time to analyzing thoroughly the operational results being achieved by agroprom collectives from use of intensive technologies, evaluating the mistakes and shortcomings in carrying out this work and to implementing a complex of measures aimed at thoroughly preparing for spring. Many examples can be found in each zone showing how, under identical conditions, farms are achieving different final results. The co-located Odessa kolkhozes imeni Kutuzov and Michurin in Belgorod-Dnestrovskiy Rayon both cultivated wheat using an intensive technology. However, the yield obtained by the former kolkhoz was 10 quintals higher than the latter, where technological discipline was violated during soil cultivation and tending of the crops. Nor are such contrasts singular in nature. A yield of 31.8 quintals of grain per hectare was obtained in Tseliniskiy Rayon, despite the fact that the average yield in Rostov Oblast is less by 11.5 quintals. The Sovkhoz imeni Krupskaya in Ulyanovskiy Rayon achieved a yield of 40 quintals, while the oblast indicator barely exceeded 18 quintals. The return from a hectare of grain is low this year in Saratov, Penza, Bryansk and Ryazan oblasts -- only 11.3-13.5 quintals per hectare. An attempt is being made in a number of areas to blame the shortfall in output on unfavorable weather conditions. Actually, the causes of the low yields have more to do with failing to attach proper value to the leading agrotechnical methods and poor work with the land.

The interests of the reorganization demand that these shortcomings in agricultural production be eliminated in a decisive manner and that priority importance be attached to the intensive technologies for developing the agroindustrial complex. In the process, special importance must be attached to the human factor for solving the immediate tasks. The experience of leading collectives reveals that only intelligent and skilled machine operators and specialists, individuals who have mastered to perfection the intricacies involved in cultivating crops using the new method, will be able to achieve a high yield from each hectare. At the present time, the training of agroprom personnel is commencing in all areas at very diverse levels. Millions of machine operators, team leaders, brigade leaders, agronomists and engineers must be trained in the use of intensive technologies and they must be certified and authorized to carry out work out on the fields using progressive methods. It is important for this training to be carried out in an organized manner. Genuine farming experts, individuals who are capable of raising to new heights the yields being obtained from grain, technical, vegetable, oil-bearing and forage crops, must be trained for the spring operations.

The intensive technologies represent both the present and the future for our agriculture. In employing these technologies extensively and converting over to

modern organizational forms for farming production, a need exists first of all for assigning the fields to well trained team and brigade collectives and for ensuring that they are supplied with soil cultivation and sowing machines, seed, fertilizer and plant protection agents. And these leading collectives in turn must cope with their increasing potential in a thrifty manner and develop a harvest worthy of the jubilee year of the Great October.

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## TILLING, CROPPING TECHNOLOGY

### EDITORIALS ON FURTHER GRAIN CROP DEVELOPMENT

#### Development of Grain Farming

Moscow ZERNOVOYE KHOZYAYSTVO in Russian No 10 Oct 86 pp 2-4

[Editorial under the "Put Into Effect the Decisions of the 27th CPSU Congress" rubric: "Grain Farming: A Strategy for Development"]

[Text] The problem of stability in the production of grain in the country is again on the work agenda of state management authorities and the labor collectives of the agro-industrial complex.

The decree of the CPSU Central Committee and USSR Council of Ministers "On Measures to Increase the Stability of the Country's Grain Farming and to Augment Cereal Fodder Production in the 12th Five-Year Plan" puts special emphasis on the increased economic as well as social and political importance of the grain problem under current conditions. It is a key problem in the food complex.

As you know, the term "grain problem" appeared in the years of the first five-year plans, when the divergence between the production of grain in the country and its rapidly growing consumption came about historically. This problem is developing continuously. Whereas it was initially conditioned by the necessity of the priority satisfaction of the continuously growing quantitative requirements for bread (read "bread problem"), today it is contingent upon quantitative and qualitative changes in the needs of our society.

Today the grain problem includes the necessity of ensuring the stability of gross grain harvests regardless of weather conditions, the continuous increase in the production of grain of a high quality and broad assortment to meet the country's growing requirements for food and fodder resources, and the expansion of export possibilities. We also stress that the grain problem involves not only the increased production of grain but its rational utilization and the reduction of losses in all stages of production and consumption.

The country's requirements for seed grain, the baking of bread, and the production of other food products are now being fully met. Our rate of

increase in the gross grain harvest exceeds by a factor of almost four the rate of increase in the population, which has an uninterrupted supply of bread, baked goods and macaroni products. Baking enterprises make about 800 types of baked goods for every taste in our multinational country. There are, however, serious interruptions in the supply of hulled and rolled products (from buckwheat, millet, etc.) and of high-quality macaroni products.

The consumption of bread, macaroni, hulled and rolled products satisfies about one-third of the daily food requirement of the country's population, up to 30 to 40 percent of the protein requirement, as much as 50 to 60 percent of the requirement for vitamin A, up to 80 percent of that of vitamin E, and also restores from 30 to 50 percent of the energy used by people.

The Food Program provides for measures to improve the structure of the nourishment of the Soviet people. An increase in its share of livestock products is possible only when the fodder base increases at a high rate. Calculations show that by 1990 the country's need for feed will be 19.1 to 19.5 times as great as its need for food grain (calculated on an equivalent basis). This speaks convincingly of the fact that in agriculture primary attention must be paid to the production of fodder. But grain farming plays a significant role in the resolution of this problem. For one must expend from 3 to 5.6 kg of grain to produce 1 kg of meat. In the indicated period, then, 156 kg of every ton of per-capita grain consumption will be expended for food and industrial processing and about 600 kg will go for fodder purposes.

The decree of the CPSU Central Committee and USSR Council of Ministers pays particular attention to this aspect of the resolution of the grain problem and emphasizes that it is necessary to make the development of grain production a priority matter, concentrate the necessary material-technical resources and scientific forces there, provide for the broad introduction of intensive technologies, and achieve the inflow into state granaries of the planned amounts of cereal, leguminous and hulled and rolled crops as well as the satisfaction of on-farm requirements for feed grains primarily through self-production. The fulfillment of the stable plans for grain procurements in the current five-year plan by each farm, rayon, oblast, kray and republic is a task of exceptional importance to the state.

There are effective ways for the further development of grain production that have been proven by many years of practice, of which the comprehensive acceleration of the intensification of farming, the utilization of the powerful arsenal of scientific-technical progress, and the introduction of up-to-date forms and methods of organizing production and labor based on full cost accounting are becoming most important.

In particular, the decree approves measures for the expansion in the current five-year plan of the areas for the cultivation of grain crops under intensive technologies to 50.4 million hectares, 20.6 million of which will be winter sown, 17.1 million in spring wheat, 4.5 million in corn, 2.7 million in legumes, 0.6 million in rice, 1.6 million in millet, 0.8 million in buckwheat, and 2.6 million hectares in other spring-sown crops.



Unfortunately, we have the sad experience of trying to solve many problems by a campaign or measure that is often needed but is not well thought out. Underestimation of the systemic nature of the problems inevitably leads in practice to oversimplification and clichés and to the irrational utilization of resources. The task now is to provide integral intensive technologies for each zone, where all components would be combined in an optimum manner excluding one-sidedness or the unfounded increase in the role of some factor or other. Here, as nowhere else, it is essential to have harmony of biological, technological, technical, organizational and economic factors, permitting a fuller utilization of the genetic possibilities of plants as well as the bioclimatic potential.

Agricultural science must become the catalyst of progress in the grain fields. The very concept of "scientific-technical progress" combines the achievements of science and technology. Science is becoming a more active and dynamic factor in technical progress and in raising the cultural and professional level of the workers themselves in the agrarian shop.

On this basis, the decree of the CPSU Central Committee and USSR Council of Ministers provides for the establishment, on the basis of research institutes, their branches, experimental stations and advanced farms, of scientific production and production systems for each soil and climatic zone of the oblast, kray or republic to ensure the practical introduction at kolkhozes and sovkhoses of intensive technologies for the cultivation of grain crops. Mineral fertilizers, plant protection agents and other material resources will be concentrated at the disposition of these subdivisions, who will also be entrusted with primary seed growing and the propagation of promising varieties, the improvement of technologies, and the development of projects for the intensification of farming and their implementation on a contractual basis at kolkhozes and sovkhoses.

This is the kind of work that is being done by the Kolos Scientific Research Association of Omsk Oblast, the Ukrainian Scientific Research Institute for Agriculture, and the Lipetsk and Ivano-Frankovsk oblast agricultural experimental stations. Here there are precise and specific recommendations for protecting the soil against erosion and plants against disease, pests and weeds and they have worked out optimum periods for the performance of procedures in agricultural technology and differentiated fertilizer doses in accordance with natural conditions, special features of the crop and variety, and the agrochemical characteristics of the soil. The All-Union Academy of Agricultural Sciences established 22 technological centers on the basis of research institutions for the timely and satisfactory resolution of questions having to do with intensive technologies. The geography of their work, the crops for which intensive technologies are being worked out, and the specific organizations taking part in the overall research have been determined.

The experience in the assimilation of intensive technologies has shown that their correct application ensures a high repayment on expenditures and raises the quality of output. Last year, they made it possible to harvest an additional 16 million quintals of grain. This year at Zavety Ilyicha Kolkhoz in Lipetsk Oblast, the intensive technology for the cultivation of winter

wheat made possible the receipt of almost 60 quintals of wheat per hectare, despite the lack of summer rains over a period of 50 days. But not all farms obtained the increase they were counting on. The necessary requirements were not always adhered to. And not everywhere did they provide for highly skilled personnel, precise knowledge of plant physiology, and the strictest technological discipline. An analysis shows that up to 70 percent of the shortage in output must be attributed to various technological violations.

We have no right to ignore the fact that intensive technology proves effective only with high production standards within the framework of a rational system of farming. There will be no results where this does not exist. What, for example, do mineral fertilizers do for acid, eroded or salty soils? Nothing, except for losses and high production costs.

On this basis, the decree of the CPSU Central Committee and USSR Council of Ministers entrusts the USSR Gosagroprom and the councils of ministers of the union republics with the organization of the efficient utilization of lime and gypsiferous materials and strict adherence to the requirements prohibiting the application of intensive technologies and high doses of physiologically acid mineral fertilizers without first deoxidizing the soil. Tasks were established for the delivery of lime materials, the liming of acid soils and the application of gypsum to alkaline soils in the union republics.

In the final analysis, the resolution of the grain problem and the provision of stable grain production depend upon people and their attitude toward the work. The deeper one delves into the knowledge of his chosen occupation, the more he loves his own work and the better he performs it. Everyone likes to consider himself not the performer of someone else's will or of instructions that are not well thought out but as a respected and skilled worker. But independent thinking and behavior and freedom of action are stimulated by knowledge and competence, for it is precisely they that give this inner freedom and self-confidence and that make it possible for those qualities to appear that society needs so much: to take responsibility and to be bold and show initiative. But what kind of independence can one expect of a person who has only a general idea of his own work and who is only vaguely informed about the specific features of new technology?

Let us take, for example, the introduction of intensive technologies for the cultivation of grain crops. The machine operators who will perform this work in practice are trained in the agricultural professional and technical schools and on the farms but there they are mainly taught one thing: how to operate machinery. This is important, no doubt. The contemporary machine operator, however, needs profound knowledge of the entire progressive technology for the receipt of large stable harvests: plant biology, the fundamentals of agricultural technology, agrochemistry and plant protection. Today, as never before, there is a great deal to be done to increase special knowledge and professional skill. All the more so because for this there is no time to waste. The large scale of these plans requires the accelerated resolution of problems in increasing the professional skill of personnel.

Further progress in grain production is unthinkable without solid knowledge, high skills and the strictest observance of technological discipline.

Intensive technologies are the boundary where the routine of obedient performers ends and the art of creative agriculturists begins.

The indicated decree puts special emphasis on the training and retraining of personnel of mass occupations, specialists and managers of kolkhozes, sovkhozes, agro-industrial committees and associations. It pays attention to the necessity of making changes and additions to the curricula of VUZ's, tekhnikums, vocational and technical schools, and courses for the retraining of the corresponding personnel.

The decree covers the entire range of problems in the establishment of the material-technical base for intensive grain farming. It provides for the organization of production and the specific delivery of agricultural machines and equipment to farms cultivating grain crops under intensive technologies. The corresponding ministries and departments are given the responsibility of annually fully meeting the mineral fertilizer requirements for fall application for winter grains and fallow land to be sown in spring crops cultivated under intensive technologies and to take the necessary measures for the issue and delivery of plant growth regulators in the necessary amounts as well as plant protection agents.

The June (1986) CPSU Central Committee Plenum requested that losses in everything that is grown be reduced to a minimum. The growing concern about reducing losses is one of the good signs of the time.

The decree focuses attention on the necessity of taking measures for the rational utilization of cereal fodder resources, for the elimination of shortcomings in the storage and processing of grain, for the acceleration of technical reequipment and the reconstruction of enterprises in the grain products system, for ensuring the introduction of the most advanced technologies into production, and for the improvement of the quality of flour, hulled and rolled products, baked goods and macaroni products.

The decree of the CPSU Central Committee and USSR Council of Ministers "On Measures to Increase the Stability of the Country's Grain Production and to Augment Cereal Fodder Resources in the 12th Five-Year Plan" is a document that defines the strategic directions for the steady development of grain farming in the new five-year plan. Much has already been done in the agrarian sector to increase the stability of grain production. A tremendous potential has been established and the direction and mechanism of management are being reorganized. The main thing now is to make full use of these means.

The sacred duty of every worker in the agro-industrial complex is to ensure the stability of grain production through his self-sacrificing labor, to increase the gross harvests of grain, and to fulfill successfully the plans and socialist obligations for the 12th Five-Year Plan.

Special attention to the fulfillment of the first commandment. As the decree notes, the fulfillment of the stable grain procurement plans for the current five-year plan by each farm, rayon, oblast, kray and republic is a task of exceptional importance to the state.

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### Preparation of Seed Stocks

Moscow SELSKAYA ZHIZN in Russian 18 Oct 86 p 1

[Editorial: "Gold Fund for the Harvest"]

[Text] The workers in the APK have many urgent responsibilities during these autumn days. They have to complete the harvest, fulfill the plans for the sale of grain and other produce to the state, and lay a secure foundation for next year's harvest. The winter planting is still going on in the south of the country, fall plowing is being done in most rayons, and the entire sequence of field work is continuing unabated. The farmers are striving to consolidate and surpass the results achieved in the first year of the five-year plan and to take another giant step forward in the realization of the Food Program of the USSR.

Along with the use of chemicals, reclamation and technical reequipment, one of the decisive factors in the steady development of agriculture is the improvement of the grade and sowing qualities of seeds, which are justifiably called the gold fund of the harvest. They always achieve good final results where primary attention is paid to seed growing and where they sow first-class graded seeds. There are many examples of this. The kolkhozes and sovkhoses of Kuban harvested more than 42 quintals of grain per hectare this year. The farms of Timashevskiy, Kanevskiy, Ust-Labinskiy and other rayons substantially exceeded this level. Thanks to the mass use of intensive technologies and efficiently organized work in seed growing, excellent harvests were achieved by Padomyu Latviya Kolkhoz in Latvia. Kolkhoz imeni N.K. Krupskaya in Ulyanovsk, Kolkhoz imeni Michurin in Poltava, Put k kommunizmu Kolkhoz in Kustanay, Ural Kolkhoz in the Bashkir ASSR, Kolkhoz imeni Uritskiy in Novosibirsk, the Orel Pedigree Plant imeni XVII syezda partii and other farms. It is important everywhere to make extensive use of the experience of the advanced collectives in the development of seed growing.

The main thing now is for the managers of kolkhozes and sovkhoses and local agroproms to ensure the establishment of a full supply of seeds with a reserve for the entire area of the spring planting, the fulfillment of the plan for their inclusion in the state reserve stocks, and the good preparation of all stocks for the spring. Basically, enough seeds of wheat, barley, oats and rice have been procured. More seed of strong and hard wheat has been stored than last year. The farms of the Ukraine, Kazakhstan, Lithuania, Latvia and many oblasts and autonomous republics of the RSFSR have been fully supplied with seed material for cereals.



At a number of places, however, they are in no hurry to establish standard seed stocks for the spring planting. In this matter, there is a lack of organization and inaction. In particular, some of the kolkhozes and sovkhoses of Uzbekistan, Azerbaijan, Tadzhikistan, Moldavia and some rayons of the RSFSR are not supplied with their own seed for grain crops. The managers of the farms and RAPO's usually explain this situation through unfavorable weather conditions during the time of the harvest. True, there were difficulties, especially in the eastern part of the country. But the main reasons for the problem are the poor work of republic, kray and oblast APK authorities in the improvement of seed growing, the delay in the harvest of seed sections, and the lack of proper concern about the preservation and preparation of seed material. In eliminating these shortcomings, it is important to include in the seed stocks more grain from the best commodity batches, to organize an interfarm exchange, and to accelerate its removal from seed farms and the experimental demonstration farms of research institutions.

Not all kolkhozes and sovkhoses have been successful this year in acquiring enough seed material of hulled grains and legumes. To correct the situation, it is essential to put into action all internal possibilities of the farms and rayons for building up the seed supplies of buckwheat, millet, peas, beans, vetch and lupine. The USSR Gosagroprom [State Agroindustrial Committee], the USSR Ministry of Grain Products and their local departments are called upon to register all supplies of the seed of these crops and to carry out efficient exchange operations, inter- and intrarepublic transfers, and the removal of seed from state resources so that all kolkhozes and sovkhoses will have enough for the entire planned sowing area.

But storing enough seed is only half of the matter. It is important for every kilogram of seed to have high sowing qualities and to ensure uniform growth of shoots and a good harvest. For this purpose, it is essential to begin in the fall the careful inspection of all established stocks and to carry out the cleaning, drying and incrustation of the grain. Unfortunately, so far only a little more than 58 percent of the stored seed of spring grain and leguminous crops (excluding corn) has been checked. Of this, 80 percent meets sowing conditions.

As a study of the local situation showed, some kolkhozes and sovkhoses have an irresponsible attitude toward the preparation of seed. In Kaluga Oblast, for example, 139,000 quintals of the seed of spring grain crops, 32 percent of what was checked, were found to be substandard. And how can there be quality if more than half of the grain-cleaning stations here stand idle and only 845 of 1,779 winnowers are working? The managers of the farms and RAPO's of Spas-Demenskiy and Ulyanovski rayons, where almost the entire sowing material is substandard, are committing inadmissible violations of technological discipline in carrying out urgent work. One asks, what kind of harvest can be expected here if this kind of mismanagement is permitted? And why have the party committees still not undertaken a basic assessment of such facts?

In taking decisive measures to establish order in grain stocks, more attention must be paid to the seed of other crops. The flax growers of the RSFSR and Estonia have not been provided enough sowing material to meet all of their needs. Meanwhile, the flaxseed growing stations could help out here. But



most of them are working just one shift. Much also needs to be done to improve the purity and germination of sunflower, soybean, rape, cotton and grass seed.

All machinery for the cleaning, drying and sorting of seeds must be operating at full capacity during this fall season. They are acting correctly where special brigades and links working under a collective contract perform urgent work in two shifts. The processing enterprises of Moldavia that are providing up to 70,000 tons of hybrid seed to various regions of the country have established flow production in the processing of corn. Intermittent seed stocks of winter-sown crops require the especially close attention of agronomists.

A full supply of seed of high quality is the guarantee for the further increase in the yields of our fields.

#### Harvest Preparation Work

Moscow SELSKAYA ZHIZN in Russian 13 Nov 86 p 1

[Editorial: "For the Future Harvest"]

[Text] The rural workers are celebrating their holiday, the Day of the Workers of Agriculture and the Processing Industry of the APK [agro-industrial complex] with good deeds. The agriculturists have had a rather good harvest. The gross harvest of grain will amount to about 210 million tons, which exceeds its average annual volume of production in the last five-year plan by almost 30 million tons. The country's needs for other types of agricultural output and raw materials will be more fully met. The efforts of kolkhoz and sovkhoz workers and their partners must now be directed to the successful completion of all work in the current season so as to consolidate and surpass what has been achieved and to establish a dependable basis for the future harvest.

The decisions of the 27th CPSU Congress, which have established an atmosphere of active reorganization in the society and the conditions for the acceleration of social and economic processes, call upon all APK workers to demonstrate a truly effective concern about the productivity of our fields. It is important to make full use of the material and technical potential in the rural areas and to seek a high yield from each hectare of land, each machine, and each kilogram of seed and fertilizer. The managers and specialists of the agroproms are called upon to make a profound study of the internal possibilities of the farms and to ensure the fulfillment of entire complex of fall and winter agricultural measures aimed at increasing yields.

This is precisely the mood in which the farmers of Kuban are now working, having harvested almost 42 quintals of grain per hectare. More than 1.5 million hectares in the kray have been sown in winter crops--wheat and barley--which are being attended to carefully. Fertility teams deliver organic fertilizers to the fields and apply them to the soil, seeds are brought up to first-class condition, and ameliorative work is actively

pursued. The occupational training of personnel is beginning everywhere and the system for remunerating labor is being improved. The APK collectives of the Stavropol and Orenburg areas and a number of oblasts in the Ukraine and Belorussia are doing much to increase the fertility of the land. It is necessary to be more active everywhere to prepare for the spring planting and to strive persistently, in the spirit of today's demands, for a good harvest.

Seed preparation is a matter of paramount importance requiring special attention. To a considerable extent, it is precisely seeds that determine the magnitude and quality of agricultural output. Basically, enough seed of grain crops has been laid in for the upcoming spring planting. The farms of the Ukraine, Kazakhstan, Lithuania, Latvia and Orenburg, Rostov and Belgorod oblasts have a better supply of their own seed than other places. At the same time, a number of kolkhozes and sovkhoses in Uzbekistan, Azerbaijan, Turkmenistan and the eastern rayons of the RSFSR have not coped with the plans for the laying in of seed, which requires the inclusion of additional quantities of grain in the seed stocks and exchange operations. It is also necessary to build up the stocks of seed for buckwheat, millet, peas, vetch, lupine and vegetable crops.

But the main thing that the managers of farms and agroproms must be concerned about is the quality of the seed material. So far, only 83 percent of the seed checked meets the requirements of sowing conditions. The situation is especially alarming in Kurgan Oblast, where three-fourths of the reserves checked have excessive weediness and moisture. Here there is very little seed designated for intensive technologies: 3 percent first class, 10 percent second class. There is just as much substandard seed material in Sverdlovsk and Permsk oblasts. The managers of some farms and RAPO's (rayon agro-industrial associations) are trying to claim poor weather conditions in the fall to justify the existing situation, are not taking effective measures to eliminate shortcomings, and have not organized the efficient work of grain cleaning and drying machines.

The matter of the preparation of machinery is no less important. After returning the machinery from plowed areas, many advanced kolkhozes and sovkhoses immediately began reconditioning work and preventive maintenance. The result was that almost their entire machine pool was in storage. In the country as a whole, 9 tractors out of 10 are in good working order. The repair of plows, sowers, potato planters, cultivators, fertilizer spreaders and amelioration equipment is going considerably worse, especially in Tadzhikistan, Moscow and Saratov oblasts, and Mariyskaya ASSR. It is necessary to examine carefully all machines as soon as possible and to provide for their timely repair and secure storage. The enterprises of the Ministry of Tractor and Agricultural Machine Building and other ministries and departments are called upon to ship the necessary spare parts and materials to the repair services. So far, unfortunately, the Odessapochvomash Production Association, the Altay Tractor Plant, the Noginsk Fuel Equipment Plant and others have not been meeting the schedules for their delivery.

The improvement of the fertility of soils is assigned a special role in the intensification of plant growing. The experience of many Kuban and Belorussian farms shows convincingly that, in addition to the efficient

utilization of mineral fertilizers, it is necessary to saturate the fields with a maximum of organic matter. In the fall and winter period, there is the possibility everywhere of accumulating a considerable quantity of manure and compost from the farms and edges of the fields and of working it into the soil in the spring. Unfortunately, a number of kolkhozes and sovkhoses underestimate the importance of local fertilizers. In Novosibirsk, Kuybyshev and Kemerovo oblasts, they apply only 1.3 to 2.4 tons of organic matter per hectare of plowed area. This is extremely little. It is necessary to put the procurement and hauling of organic matter under the strict control of the RAPO's. It is the duty of agronomists to be concerned about every hectare of winter sown crops, not to allow their being damaged, and to ensure the timely and qualitative supplementary feeding with fertilizers.

In the interests of increasing the harvests of grain and other crops and of improving the quality of output in the second year of the five-year plan, the area planted under intensive technologies is being expanded to 36 million hectares. This is a complex but quite feasible task. The experience of this season confirms its feasibility. To achieve a more ponderable yield from the means employed, it is essential to assign all intensive fields to brigades and links, to allocate the necessary equipment and fertilizer to the contract collectives, and to teach the machine operators the rules for caring for the crops in the development phases of the plants.

Every fall and winter day for the harvest of the coming year! Working in this season at an accelerated rate means to multiply the strength of the land and to increase the production of output.

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## FUELS

### HYDROGEN STUDIED AS FUEL FOR FUTURE

Minsk SOVETSKAYA BELORUSSIYA in Russian 2 Oct 86 p 3

[Article by V. Struminskiy, academician USSR Academy of Sciences, winner of the USSR Lenin and State prizes: "Hydrogen--the Fuel of the Future"]

[Text] The great Russian chemist Dmitriy Mendeleev once said: "Burn oil--it doesn't matter that you are stoking the furnace with banknotes." It was said sharply, but truly. When pure hydrogen is used as fuel, extremely valuable hydrocarbon raw material can be consumed considerably more efficiently.

As far back as the 1950's a set of studies was made, as the result of which we, along with Academician A. M. Lyulkaya and a group of our scientific colleagues, became convinced that traditional hydrocarbon fuels had become obsolete and should be replaced by hydrogen. The use of hydrogen will make it possible to take a great leap forward in the development of aviation and rocket technology and forge a broad path to space. In the years following it became clear that hydrogen, this ecologically pure fuel, could make a fundamental increase in the efficiency of other types of transport and be used directly for fuel for cities and production of electrical power for everyday needs and be effectively used in ferrous metallurgy, the chemical and other sectors of industry. The advantages of hydrogen will become even more obvious when one takes into consideration its basic, inherent qualities as a power carrier.

Electric current, the transmission of which is economically, as we can see, much less advantageous as compared, for example, with hydrogen transmission, is the most widely distributed energy carrier in the world today. In addition, electricity as a power transmission agent has a major, intrinsically inherent disadvantage. Electricity does not lend itself efficiently for storage in large quantities. An important quality of hydrogen, as compared with electricity, is its potential for accumulation in reservoirs, particularly in huge natural underground storage places. Some scientists, in studying accumulated energy, start from the mechanical, electrical, thermal and chemical aspects and point out, among other things, the possibility of using hydrogen. The demand from large regions for energy changes almost two-fold, depending on the time of day and time of year. This is confirmed by data from power engineers. The power and amount of thermal and nuclear electric power plants are as a rule determined by the peak loads. If it were proven possible to build up their electric power in periods when there is a drop in consumption or to convert

to the creation of powerful plants, generating hydrogen as an energy-carrier, the amount and power of the thermal and nuclear electric power plants could be approximately halved.

The fuel-energy resources of Siberia are very important today for supplying power to the Ural and Central regions of the country. Merely by using the casing-head gas collected during oil extraction, it will be possible to obtain and turn over, along the existing oil pipelines, about 15 million tons of motor fuels, which is approximately equivalent to the power of 30 major nuclear reactors. Various methods of obtaining motor fuels from hard coal are also being developed and tested. The methodology for obtaining hydrogen from various mineral hydrocarbon fuels, including hard coal, will be slightly more complicated. This direction, however, has so far not been properly developed in Western Europe nor in the United States, nor in our country, even though we have a definite scientific-technical stockpile of semifinished work underway on this problem.

Today energy from almost all its sources is being converted, as a rule, into an electrical current. This in itself implies the still-existing place of the underevaluation of hydrogen and leads to developing an excessive number of heat and nuclear electric power plants in the world and to surpluses of power being generated and disruption of ecological equilibrium. Our calculations, and the calculations made in many other countries show that using hydrogen pipelines is 10-15-fold cheaper than transporting the same amount of power along higher-voltage power transmission lines.

Meanwhile, all the continents still have considerable resources of mineral hydrocarbon fuel, including hard coal, which could serve for hydrogen production for a long time. Hydrogen is opening up great possibilities for using the most significant source of energy--the sun. Incidentally, only in this way can mankind avoid overheating of the earth and changes in its climate. In addition, this source of energy is the purest. Great possibilities are opened up for the use of solar radiation, wind-force energy, sea waves, etc. There are also plans to create powerful space stations in order to obtain energy by means of semi-conductor and another type of solar batteries. This entire direction, however, has so far not been able to draw the proper attention. Therefore, many of them are poorly developed, even though they may play a no less important role in the story of mankind than thermonuclear and nuclear energy sources.

Hydrogen is one of the lightest gases, lower by a factor of 14 than air, and liquid hydrogen is lower than aviation fuel by a factor of 13. At the same time, a kilogram of hydrogen contains almost three times more energy than the best grade of gasoline. In its liquid state, however, it is at extremely low temperatures, in the order of  $-253^{\circ}\text{C}$ . Therefore, a tank with liquid hydrogen will heat quickly, and the hydrogen will evaporate. To avoid evaporation, the walls of the tank are covered with special multi-layer insulation, which is like an ordinary thermos bottle with a large number of reflecting screens. As is evident, it is not easy to use the energy advantages of hydrogen, but it can and should be done.



Since hydrogen is much lighter than aviation fuels, the hydrogen tanks should be much larger in volume. The hydrogen fuel can be housed on airplanes, not in the wings, as is usual, but in the fuselage. Using liquid hydrogen makes it possible to create supersonic passenger planes (speed in the order of 10,000-12,000 km/hr), and essentially improve the flight potentials in planes with lower speeds. Supersonic passenger planes will be able, in turn, to serve as the basis for the development of reusable double and single-stage space vehicles, which are capable of opening up a broad road for mankind in space.

Passenger aviation today consumes a huge amount of hydrocarbon fuel (approximately as much as an entire motor vehicle fleet), polluting the atmosphere considerably. In the scientific-technical respect it is now ready to make the transition to hydrogen fuel. Unfortunately, there is so far not enough of this fuel. Scientific-technical workers and designers have not created a method for obtaining it that is competitive with respect to the economic indicators.

Converting motor vehicle transport to hydrogen is of the greatest importance for a drastic improvement in the air of large cities. Testing-unit experiments for the CAZ-652 Soviet engine, operating on cylinder hydrogen, were made, apparently for the first time in the world, at Novosibirsk in 1968. They showed that in a broad range of change in the concentration of the hydrogen-gasoline mixture a series-produced engine operates stably with partial loads, increases combustion completeness and also increases the efficiency.

Our country began systematic experiments of the IMZ-240 engine on a testing unit and then performed road tests of the RAF-2103 motor vehicle with this engine. At first, series-produced containers for industrial needs were used to place the liquid hydrogen on this motor vehicle. They were too big, however, and after that were replaced with a specially manufactured tank. Tests showed that with a 5-10-percent additive of hydrogen to the basic fuel, the engine operated stably under all conditions and the toxicity of the exhaust gases dropped sharply through increasing the completeness of combustion of the mixture; the engine efficiency increased and the fuel saving reached 40 percent.

Motor vehicle transport is thus also ready to begin direct use of hydrogen, but so far there is an insufficient quantity of this fuel. Consequently, urgent measures must be taken to develop industrial processes using various sources of energy to produce hydrogen, and particular attention must be paid to ecologically pure sources of energy.

Just what is it today that still restrains the use of hydrogen fuel, and what must be done so that this energy-carrier is widely used in the national economy? First of all, it is still more expensive than mineral fuel. The production cost of hydrogen, however, can be reduced, at the same time as mineral fuel becomes more expensive as the sources of it are exhausted. The use of hydrogen fuel is also linked with the development of special equipment. And finally, there is still a psychological barrier. It is important, however, to overcome the prejudice connected with using hydrogen as fuel. One can remember, with respect to this, that at the dawn of motor vehicle building some specialists felt that there was such a real possibility of gasoline in a vehicle's tank

exploding that when it moved it should have a person with a flag going in front of it. This brings forth a smile today. The present-day talk about the exploding of hydrogen fuel reminds me of that somehow. Studies made by scientists of various countries show that this fuel is even less dangerous than natural gas, gasoline and kerosene.

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## FUELS

### BALTIC SEA OIL ENVIRONMENTAL QUESTIONS DISCUSSED

Vilnius SOVETSKAYA LITVA in Russian 29 Oct 86 p 2

[Interview with Vitautas Statulyavichyus, vice-president of the Lithuanian SSR Academy of Sciences, by Tereze Kezene: "Nature Created a Sand Bar and People Should Preserve It"; date and place not given]

[Text] A. Pilipaitis from Kaunas, I. Zabela from Panevezhis, K. Surgaitene from Klaipeda and other readers are interested in whether oil has really been found on the Baltic Sea shelf, not far from the Kurshskiy sand bar. They are interested in whether an oil field will be developed there and, if it is, what effect it will have on the unique nature of the sand bar. We asked Vitautas Statulyavichyus, vice-president of the Lithuanian SSR Academy of Sciences, to answer our reader's questions. He is deputy chairman of the provisional Scientific and Technical Commission formed at the USSR State Committee for Science and Technology, which has been commissioned to examine the plan for environmental measures in connection with the preparation for operating the oil deposit in the Baltic Sea.

[Question] How do you assess the fact that oil has been found in the Baltic, and that preparations are already being made to begin working this deposit?

[Answer] We transported petroleum products for thousands of kilometers and complained about how bad it is that the petroleum deposits in the European part of the USSR have been exhausted. Petroleum is now coming along the oil pipeline from the far reaches of Siberia. This route is not inexpensive either. Therefore, we were naturally interested in whether the Baltic is hiding oil in its depths, as are many other seas. The USSR, the German Democratic Republic and the Polish People's Republic have signed an interstate agreement to begin a search for natural resources in the Baltic Sea. The interstate Petrobaltik Organization was thus formed. In addition to this organization, the Production Association for Petroleum and Gas Extraction of the USSR Ministry of the Gas Industry is also conducting a search. This association is located in Kaliningrad. Petroleum is already being extracted there on dry land, and preparations are being made to start the operation of one marine deposit.

Deposit D-6, located not far (22 km) from the Kurshskiy sand bar, has been studied most. The Ministry of the Gas Industry has therefore also begun to prepare to establish the first petroleum-extraction platform, which will become one of the four permanent platforms.

This situation has formed: it would seem, quite advantageously that here, right alongside of us, a new petroleum source has finally been discovered. The oil field, however, risks polluting the Baltic Sea, which is surrounded by many states that have signed a special Convention for its conservation. Extremely peculiar nature complexes, protected by the laws of the Lithuanian SSR, have been placed at the coast. Just take the Kurshskiy sand bar, formed by nature and with upkeep by the hands of the foresters and the nature conservation workers. Large funds were invested just to protect it from winds and storms. The sand bar is fragile, an accident happens at the oil field with an oil spill, and there is an immediate start of erosion and other harmful processes, many of which can prove to be irreversible. Therefore, the problem arose as to how, having created the oil field, this nature study corner would be preserved in the future. In addition, construction is starting and there is no plan and the preplanning approaches have many essential shortcomings.

On the request of the republic, the USSR State Committee on Science and Technology formed a special commission. It included eminent scientists and specialists in petroleum operations and nature conservationists. Questions of how to ensure protection of the sea and the environment against pollution were discussed and debated and advice was asked.

[Question] What is being done today so that there is no environmental pollution and so that green earth, pure air and translucent water may be preserved?

[Answer] The nature conservation problem is in first place after the problem of peace preservation. In 1986 a comprehensive scheme for environmental protection in the Lithuanian SSR until the year 2000 was approved. Basic strategic directions were established in it for environmental protection of the habitat and efficient use of natural resources. Particular attention has been directed to environmental protection of the seacoast. A comprehensive system for its protection has therefore been created. The Ecology Scientific Production Association is being formed so that the scientific work in this direction be better coordinated and put into practice.

[Question] I am familiar with the documentation presented by the compilers of the project. They do not deny the fact that petroleum extraction in itself is already polluting the atmosphere to a certain extent. Isn't it possible to avoid this? In addition, the designers have confirmed the fact that measures have been specified to prevent accidents....

[Answer] The petroleum industry planning has been commissioned to two institutes. It cannot be said that the designers are not fully taking into account the environmental protection requirements. When we discussed, everything, however, we saw that so far there are no real possibilities of fully ensuring against accidents that have fatal consequences for the environment. We have

a bitter experience on this score. When, in 1981, The English tanker Globe Asimi had an accident at the Port of Klaipeda and spilled mazut, it spread over all the barriers to the open sea, immersed a wide portion of the coast, the dunes and the Palanga beach and reached Liepaje. We remember how many resources and how much strength were needed to take up and remove the layer of polluted sand. The losses reached several hundred million rubles.

About two years later the Petrobaltika floating platform also suffered an accident: about 70 tons of oil flowed out during drilling, and they ended up at the Kurshskiy sand bar. The Geography Department of the Lithuanian SSR Academy of Sciences, in conjunction with the Institute of Oceanology named P. Shirshov, studied the consequences of these accidents and published the book, "The Effect of the Mazut Spill on the Ecological System of the Baltic Sea." We thus know quite a bit about the consequences of such accidents for the water and the human environment.

[Question] What mistakes do you see in the planning designs?

[Answer] In the opinion of many members of the commission, the greatest planning mistake lies in the fact that they did not take into consideration the demands of the party and the government on introducing modern advanced technology. The technological processes that they suggested are either old, similar to those that were used in the Caspian Sea, or have never been tried anywhere, and are even dubious. This is in the first place. In the second place, the designers did not take into consideration the probability of accidents, the reliability of the whole technological system and blocks of structures and the strength of the platform under the extremal conditions that arise during a storm or icing up. They took the average value everywhere--the average waves of the Baltic, the average velocity of the winds, approximate and essentially unrealistic, the time appropriate service could be rendered at the site of the accident, etc. The Baltic Sea is stormy and cold. The biological processes that clean the water are much slower than, shall we say, in the Caspian Sea.

The Commission stated in its resolution that, when the sea swell was over 3-4 points (wind velocity about 6 meters a second), it is impossible to hold back and catch the spilling oil, there are no means to do it. The means proposed by the authors of the plan will not be able to guard against polluting the littoral of the Kurshskiy sand bar and the sea areas adjacent to it.

With strong and prevailing west, southwest and north winds, the oil may reach the sand bar quite quickly, since strong flows (up to 2 meters per second) are observed along the shores. In 4-6 hours the oil can reach Nida, and then Palanga and the health resorts of Kaliningrad Oblast and the Latvian SSR.

[Question] Still, what prospect do you see, and what technology is necessary for extraction of Baltic oil?

[Answer] Working the Baltic deposits can be begun only by using particularly reliable technology, tested in the less vulnerable sites in the World Ocean, which we, unfortunately, do not yet have. The requirements of the State



Standard, in accordance with which the oil spilling on the sea surface should be contained and collected by technical means and methods, safe for living organisms, and having no adverse effect on sanitary and everyday use of the water, cannot be met by the purchaser without very reliable technology.

It was said at the visiting session of the Commission at Nida that the oil workers do not yet have the proper sense of responsibility for ecology, because they consider themselves obligated only to extract oil and work the deposit. The polluted sea and shore should, they say, be cleaned up by others--the fleet organizations and local soviets, the fires put out by specialized fire subdivisions, etc.

We have estimated, using methods of the theory of probability, the probability of accidents and how much damage will be inflicted by an oil spill, above all, of course, on the Kurshskiy sand bar. In addition, one must not forget that the Baltic is an international sea, and that the Baltic Sea Convention, of which we are members, imposes strict requirements. It would be a great mistake not to take all this into consideration. Deposit D-6 is relatively small, but the ecological losses from working it can far surpass in value the oil extracted here.

In Soviet Lithuania, just as in the entire Soviet Union, definite progress has been achieved in nature conservation, it is recognized on an international level and it is perceived and evident in our everyday life. This permits us to believe that the problem of environmental protection, of which we are speaking, will also be solved positively.

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## FUELS

UDC 658.562.64:622.33(47+57)

### RADICAL IMPROVEMENT IN COAL INDUSTRY CALLED FOR

Moscow UGOL in Russian No 10, Oct 86 pp 3-6

[Article by G. I. Nuzhdikhin, Deputy USSR Minister of Coal Industry: "Ways to Improve Radically the Quality of Coal Industry Output"]

[Text] "The execution of measures to raise output quality in all branches of the national economy is of great importance" (from the report of CPSU Central Committee General Secretary M. S. Gorbachev at the June 1986 CPSU Central Committee Plenum).

Inspired by the decisions of the 27th Party Congress and the June 1986 CPSU Central Committee Plenum, collectives of the industry's enterprises and organizations have improved their work, as a result of which the coal industry overfulfilled state plan goals for the first 8 months of the year. Industrial output exceeded that for the same period of last year by 5.3 percent, while the annual goal was 1.3 percent. Coal mined grew by 17.8 million tons, 12.3 million tons above the plan. The plan for concentrate output was fulfilled 103.9 percent, graded fuel 103.7 percent. Also overfulfilled was the plan for sales of commodity output in wholesale and settlement prices.

USSR Minugleprom [Ministry of Coal Industry] as a whole met the plans for coal shipments to customers, labor productivity, prime cost of producing commodity output and profit, and quality of the coal mined and shipped.

Laboring collectives that mine and ship high-quality coal output to the national economy and produce machinery, instruments and consumer goods that correspond to the world's best models in quality are at work in each region, coal basin and association.

The branch is paying special attention to quality of the coal mined and shipped. A further buildup in mining volume without an essential improvement in coal putput quality will hamper the possibility of increasing the coal industry's operating effectiveness. Thus, while coal mined in 1985 increased by 8.7 million tons over 1980, the ash content of the coal mined rose 1.8 percent. An inadequate level of dressing of run-of-mine coals and of screenings and the low quality and technical level of various types of mine-automation equipment are among the weak spots in the industry's operation.

An increase in the amounts of high-ash Ekibastuz, Bikin and Moscow-area coal, a reduction in the amounts of low-ash Kuznetsk and Raychikhinsk coal mined, and a worsening of mine-geology and mine-equipment conditions affected greatly the quality of the coal mined during the 11th Five-Year Plan. An

increase by 0.2 meter of the specific distance (per 1,000 tons mined) of the developmental workings made and an increase in their cross-sectional area led to additional contamination of the coal by rock. A reduction in the average thickness of the seams worked by the underground method led to increased chopping into the floor and roof rock at working faces. With a view to reducing rock contamination of the coal during mining and transporting during the 11th Five-Year Plan, 129 longwall miners of a new engineering level were introduced at coal enterprises, the methods of chemical hardening and bolting of unstable rock were used at 189 mine faces, and mining by excavators that tear off the coal in lumps rose 4.4 million tons. The share of mining with rotary equipment that enables the shipment of coal of a lumpiness that meets the requirements of the GOST's [All-Union State Standards] rose by 5.2 percent over 1980, reaching 47.2 percent. By introducing new and mastering existing coal-dressing capacity, the amount of coal processed rose by 32.7 million tons and was brought up to 311.3 million tons.

A number of industrywide standardizing documents aimed at averting the mining and dispatch of nonstandard fuel to customers have been developed and put into effect (Instructions on the Procedure for Accounting for Mined Coal, A Methodology for Determining the Ash Content of Coal Mined at Developmental and Working Mine Faces by the Measurement and Estimation Method, Instructions for Evaluating the Quality of Coal in Storage, and others).

Steps have been taken to intensify monitoring of and raising responsibility for the quality of coal that has been mined and dispatched. A procedure has been established for rejecting coal that exceeds the approved specifications for the amount of wall-rock inclusions for breakage work at longwalls and the limiting norms of the quality indicators for delivery to preparation plants and to customers. Personal pecuniary responsibility has been introduced for officials who are directly to blame for shipping fuel that does not meet the requirements of the standards or specifications.

The measures taken to intensify the monitoring of mining-operations performance and to improve coal-mining technology, as well as a stricter approach to setting norms for coal quality, have enabled some slowing of the increase in the ash content of the coal accounted for. At the same time, they have proved to be inadequate for preventing an increase in the ash content of the coal delivered to the national economy.

The amount of coal mined from substandard seams increased by 2.8 million tons for the industry as a whole. Goals for reducing the amount of coal mined from seams that are substandard as to ash content were not met by VPO [All-Union Production Association] Kuzbassugol [Kuznetsk Coal-Basin Coal-Mining Association] and by Rostovugol [Rostov Coal-Mining Association].

The number of operating breakage faces that chop into wall rock has doubled. Mining volume from them has grown by 18.7 million tons over the 1980 level, because of which the ash content of the mined material rose 0.47 percent. UkSSR Minugleprom [Ministry of Coal Industry] has 318 such longwalls, Rostovugol 77 and Karagandaugol [Karaganda Coal-Mining Association] 20.

The planned reduction in the number of operating longwalls that cut into wall rock was not met because VPO Soyuzuglemash [All-Union Association for Coal Machinebuilding] did not meet the goals for producing the required

excavating equipment. With a goal of having at least 110 1KM-103 longwall mining machines in operation at the end of 1985, only 28 were introduced. Design deficiencies of the equipment, inadequate operating reliability, and manufacturing defects affected adversely the operation of some mine faces equipped with 1KM-103 and KD-80 longwall mining machines.

The number of developmental mine faces where the combined excavating and transporting of coal and rock are executed is still greater. The number of such mine faces in Intaugol [Inta Coal-Mining Association], Karagandaugol, Rostovugol and VPO Kuzbassugol has practically not been cut down.

Reinforcing roof rock by chemical methods has not been widely applied yet at the mines. The task of introducing this method is not being carried out fully by UkSSR Minugleprom, VPO Kuzbassugol and Karagandaugol.

While enterprises are being allocated new, expensive equipment or funds for improving mining technology and coal processing, the production plans do not incorporate revisions for improving the technical and economic indicators and the quality of the output produced.

Much contamination of mined coal occurs because of violations of operating processes and deviations from the approved equipment capabilities and operating procedures.

One of the effective ways for reducing ash content and for satisfying the national economy's need for coal of the required quality is mechanical dressing. In 1985 it was possible to reduce the ash content of the coal shipped by 3.9 percent in comparison with the amount of coal mined, 17.2 percent in comparison with amount of material extracted.

At the same time, the increase in the amounts of processing cannot be considered satisfactory. Many preparation plants that dress steam coal have a dressing depth of 6 (13) mm, as a result of which the amount of output of undressed siftings increased by 0.7 million tons in 1985 over 1980, amounting to 58.4 million tons. Solution of the problem of reequipping drying installations and replacing obsolescent and worn equipment has been slow, and the classification and dewatering front is not being expanded.

Because of a deficiency in capacity for upgrading and lack of improvement of coal-processing technology, and also because of the disparity between the resources and the consumption balance, a portion of the coal delivered to the national economy in 1985 did not meet the requirements of the standards for various quality indicators. Because the 1985 plan for producing graded coal and briquettes was not met, the amount of coal for municipal, public-facility and housing needs that was shipped with deviations from the requirements of the standards grew, causing justified complaints from the populace about fuel quality.

In 1985, violations of the GOST's were observed at 91 out of 207 coal enterprises checked by Gosstandart [State Committee for Standards] organs, economic sanctions were applied against 87 of them, and 284,000 tons of output worth 3.5 million rubles were excluded from reports of plan fulfillment. An especially unfavorable situation prevailed in the observance of the standards' requirements by UkSSR Minugleprom association and also by Severovostokugol

[Northeast Coal-Mining Association], Intaugol and Gruzugol [Georgian Coal-Mining Association], where violations of the standards' requirements were observed in more than half of the enterprises checked.

As a result of checks on observance of the standards' requirements, measures were developed for eliminating the deficiencies and violations noted in the reports, and the guilty parties were brought to pecuniary and disciplinary account. The required measures for strengthening the services that monitor coal quality have been adopted. This year, monitoring the quality of the coal mined and shipped will be fully centralized in technical and monitoring administrations for monitoring the quality of the coal and the standards, that is, the technical monitoring services will no longer be subordinate to the directors of the underground and strip mines and preparation plants.

With a view to intensifying coal-quality monitoring during all coal-mining, transporting, processing and shipping operations, in 1985 the quality monitoring services checked 106 million tons of coal directly at underground sections, 10.3 million tons of which were rejected because of the quality indicators, including 4.4 million tons of coal that were not taken up on the accounts of the sections that mined it. The shipment of 5.6 million tons of coal whose quality did not meet the specifications was stopped.

Technical monitoring administrations and sections of associations and coal enterprises must use completely the rights granted them to intensify monitoring of coal output quality and bring violators of operating discipline to account.

USSR Minugleprom is constantly taking steps to improve the systems for testing coal quality and engineering monitoring thereof during coal dressing. At present 759 mechanical samplers, 1,352 sample separators and 160 devices for instrumented monitoring, and 90 centralized sampling stations are in operation. This has enabled the level of mechanized sampling of commodity coal (and shale) to be brought up to 66.3 percent and the dressing of samples to be completely mechanized.

The industry's enterprises have introduced 46 RKTP-1, RKTP-2 and RKTV-1 ash measurers and 54 of the EAZ and RKTP-3 types. Mastery of series production of a new generation of flowline-type radioisotope RKTP-4 ash measurers (for run-of-mine coal) and RKTP-5's (for dressed output), which will have an explosion-protection version and metrological support, should start during the 12th Five-Year Plan. In 1987 tests for determining the heat of combustion of analytic coal samples with use of the BRA-11 analyzer should be completed. During the current five-year plan, work will be done to create a set of autonomous sensors (for the flowline, transport containers and withdrawn samples) and a universal computer installation for monitoring coal quality (including the heat of combustion) for the coal-industry enterprise environment.

One cannot help but note the inadequate role of scientific-research and design-development institutes in solving the problems of raising the quality of the coal mined. Thus the IGD [Mining Institute] imeni A. A. Skochinskiy, PNIUL [Moscow Region Scientific-Research Institute for Coal], KuzNII [Kuzbass



Scientific-Research Institute for Coal], ShakhtNIUI [Shakhty Scientific-Research Institute for Coal] and NIIOGR [Scientific-Research Institute for Open-Pit Mining] have no scientific subunits, and thesis-type work on the quality of the coal mined is lacking, while developments in the area of improving the equipment for and the technology of mining is not always tied in with questions of quality. Practically no suggestions have been received from these institutes on improving the quality of the coal mined.

TsNIEIugol [Central Scientific-Research Institute for Economics], as the industry's prime organization for developing and introducing comprehensive systems for controlling coal output quality, has worked for many years to create standard designs for a KS UKP [integrated system for controlling output quality] for enterprises, associations and the industry. Yet the introduction of this system is still being executed intolerably slowly.

The production associations and plants of VPO Soyuzuglemash are doing certain work to improve the quality of the output produced and to increase the service life and reliability of mining equipment. The share of output bearing the state Emblem of Quality was 32.8 percent in 1985 versus 23.1 percent in 1981.

During the last five-year plan, USSR Minugleprom enterprises and organizations developed equipment on a new engineering level and turned it over for industrial production: mechanized longwall mining machines for thin seams (1KM-103, 1KM-88 and KD-80), for seams with roofs difficult to collapse (1KMT and 2UKP) and for steep seams of medium thickness (2ANSShch); and ribbon conveyors (2L-100U, 3L-300U and 1L-80U). SP-202, SP-87PM and SP-301 flight conveyors were introduced widely.

At the same time, the quality of the coal machinery being built still does not meet today's demands and provokes serious claims on the part of underground coal mines. Gosstandart organs and USSR Minugleprom agency commissions. Sanctions have been applied repeatedly against Druzhkovskiy imeni 50-letiya Sovetskaya Ukraina Machinebuilding Plant and the Anzherskiy Machinebuilding Plant. The shipment of poor quality output has been prohibited at the machinebuilding plants Gorlovskiy and Kopevskiy imeni S. M. Kirov, Tomsk Machinebuilding Plant imeni Vakhrushev, Kiselevskiy imeni I. Chernyy, and others.

The ME-67m longwall miner, the 2PNB-2 loading machine, the GPKS tunneling cutter-loader and the 2KM-87N longwall miner have been deprived of the Emblem of Quality because they are not on a par with the best foreign models and because of inadequate reliability. Yet the production of some machines of obsolete design continues.

There have been no few complaints from mines about the quality of manufacture of equipment whose defects must be eliminated by the mines with their own forces. Thus, the Karaganda Association for the Production of Underground Mining Equipment sent the Raspadskaya Underground Mine mechanized 2UKP and 4KM-130 longwall miners with welding defects. Concealed defective parts and assembled units were found during assembly of a 1KMT longwall miner, which was made in 1985 by the Druzhkovskiy Machinebuilding Plant imeni 50-letiya Sovetskaya Ukraina, at a longwall of the Underground Mine Administration imeni Dzerzhinskiy of Rovenkiantratsit [Rovenko Anthracite Mining Association]. Mine

support sections were disabled by breakdowns of valve blocks, control blocks and hydraulic props that were caused by the presence therein of metal chips and cut-off particles of rubber and plastic that had got into them during assembly at the plant. Poor-quality products (KGU, LKM-103 and LMK-97D long-wall mining machines) were shipped from the Kamenka Machinebuilding Plant.

Coal machinebuilding enterprises and organizations were not completely supplied with measuring and monitoring equipment (measuring microscopes, optical calipers, projectors, rod-probe instruments of a high precision class, and other things).

During the 11th Five-Year Plan enterprises and organizations of VPO Soyuzguleavtomatika [All-Union Association for the Manufacture of Coal-Industry Automating Equipment] developed and mastered series production of 99 new or modernized articles for underground-mine automation: 70 obsolete models were taken out of production; the automation of conveyor transport and of fixed installations was practically completed; all types of breakage-face cutter-loaders and cutting implements that break off lumps of coal were supplied with apparatus for automated or remote control and load regulators; and the production of means for automating tunneling cutter-loaders and coal-dressing processes, as well as for monitoring and reporting on the operation of excavators and motor-vehicle transport at the industry's strip mines, was organized. The share of new articles at the association's plants was 30 percent in terms of the products list and 45 percent in terms of the volume produced.

Introduction of the KS UKP system has enabled all plants to produce output with the Emblem of Quality, the share of these articles reached 36.9 percent in 1985, and during the five-year plan period it rose 2-fold.

The economic benefit from raising the engineering level and quality of the mine-automation articles produced was 120 million rubles throughout the industry during the five-year period; 1,700 people were released by the conversion of longwall miners and installations to remote and automated control; and the level of work safety was raised.

At the same time, the apparatus for controlling mechanized mine supports, mine telemetry and communications, and instruments for monitoring the mine's atmosphere lag behind modern requirements.

The VNPO [All-Union Science and Production Association] Respirator, which developed and produced mine-rescue and mine-firefighting equipment, introduced an integrated system for controlling output quality. As of 1 January 1986, 13 articles of the highest quality category were being produced, and 6 articles were produced in the first quality category. Work was done during the 11th Five-Year Plan to increase the service lives of the OP-861 fire extinguisher and PGS apparatus, and the materials intensiveness of movable PSP and PSPM rescue units was reduced. Progressive Kvartz and Igolek communications sets, R-30 respirators and Temp-500 complexes, which possess increased indicators of reliability and decreased materials intensiveness, are being produced. The indicated articles are on a par with the world's best in their engineering level and quality. All the enumerated articles, as well as the OP-2V fire extinguishers and UP-250 installations, whose output was mastered during the 11th Five-Year Plan, were awarded the state Emblem of Quality.

During the 11th Five-Year Plan the state of affairs in capital construction improved. In comparison with the 10th Five-Year Plan, more capital investment was assimilated (29.8 percent), more construction and installing work was done (19.3 percent), more fixed capital was introduced (38.1 percent) and more total housing space was built (26.5 percent).

As a result of taking steps to improve the quality of the performance of construction and installing work, the number of facilities turned over with evaluations of "excellent" or "good" increased.

Construction and installing work quality depends greatly upon the quality of the design and budget-estimating documents. Checks that were performed indicated that not all organizations examine and accept these documents with the required thoroughness, and the designs for doing the work are not developed completely and not for all facilities.

Enterprises of Kuzbasszhilstroy [Kuznetsk Coal-Basin Housing-Construction Combine] and Ekibastuzshakhtostroy [Ekibastuz Mine Construction Combine] produce construction articles that violate the requirements of the GOST's, with excessive tolerances in regard to geometric size, with misalignment of the reinforcing cage, with the use of electric-arc welding instead of the resistance welding called for by the design, and with unsatisfactory finish and facing of the facing surfaces of constructional structure. Crushed rock, sand and gravel-and-sand mixtures are produced that violate the basic parameters--as to grain composition and content of dusty and clayey particles--which lead to an overconsumption of cement. Not all large-panel housing-construction plants have converted to the production of parts with increased thermal protection.

USSR Minugleprom enterprises are producing 520 specific commodities for consumer goods and for cultural, domestic-amenity and household purposes, with a total value of more than 44 million rubles; 156 specific articles are subject to certification under two quality categories. One hundred fifty specific articles have been certified for the first quality category, but only 6 are being produced with the state Emblem of Quality.

Attributing great importance to questions of improving output quality, and in light of the 27th CPSU Congress's decisions, the USSR Minugleprom Collegium examined and approved concrete measures for improving the equipment and the technology for mining and for processing and dressing coal, for reducing the amounts of nonstandard coal output, and for raising the quality of construction work and the output of machinebuilding and instrumentmaking and of consumer goods and services.

A Specific-Purpose Integrated Branch Program (IsKOP) has been developed for purposes of radically improving the quality of the coal mined and shipped during the 12th Five-Year Plan. It calls for:

an increase in the amounts of coal processed at the industry's OP's [preparation plants] by 28.5 million tons, bringing them up to 340.8 million tons, by introducing into operation new capacity for dressing coal, by rebuilding and modernizing existing coal-receiving and storing facilities at 29 preparation plants, by building new and expanding existing sludge storers at

15 plants and flotation and filtration divisions at 8 plants, and by modernizing the drying divisions at 12 plants;

a 2.1 million-ton reduction of mining coal from seams and members that are nonstandardized as to ash content;

a reduction to 300 of the number of breakage faces that operate with chopping into the wall rock;

the conversion of 149 developmental mine faces to the separate excavation and transporting of coal and rock;

introduction of a technology for strengthening roof rock of breakage faces that are equipped with longwall miners, by injecting binding substances;

an increase in coal mining by lump-producing excavators by 11.3 million tons, bringing the total to 28 million tons in 1990; and

a rise in the level of mining coal with rotary equipment by 2.8 percent, bringing it up to 50 percent of all strip mining by 1990.

Execution of the indicated measures will permit the following in 1990, in comparison with 1985:

a 0.5-percent reduction in the ash content of the coal mined;

a 0.6-percent reduction in the ash content of coal shipped to the national economy;

a reduction by more than 17 million tons of the amount of coal shipped that deviates from the requirements of the standards; and

a rise to 70.1 percent of the level of mechanized and automated sampling of commodity coal.

More attention will be paid during the 12th Five-Year Plan to moral and material factors for raising worker skills, to the wide dissemination of the experience of advanced collectives that have been awarded AMOTU and Gosstandart certificates entitled, "For Achieving the Best Results in Producing Output of the Highest Quality Category," and to the creating of output-quality circles at all enterprises and in all departments and sections.

The USSR Minugleprom Collegium and the Presidium of the Central Committee of the Trade Union of Coal-Industry Workers have approved the terms of the All-Union Competitive Examination for Coal Output Quality and have instituted the chest emblem, "For Coal Quality."

The introduction of an additional indicator for meeting the goals for ash content (or for calorific value) of the coal that is mined into the terms for awarding bonuses has enabled plan discipline to be raised greatly and the material motivation by blue-collar workers, engineers and technicians of all levels of control to ensure good-quality fuel to be intensified. Thus, the number of associations that did not meet the plan indicators for ash content

during the first half of 1986 was halved for USSR Minugleprom and cut 2.5-fold for USSR Minugleprom. The selling value of the coal exceeded that planned by 48 million rubles through an improvement in quality.

A strenuous plan in regard to the coal's ash content (26.6 percent) was adopted for 1987--for the first time it was not increased over the previous year's level--and the coal's planned ash content will be reduced eventually. The development and implementation of a complex of organizational and engineering measures aimed at improving the technology for mining and for dressing coal and at radically improving coal-output quality must be undertaken without delay by each association and enterprise. It should be remembered that the production of output that deviates from the requirements of the standards will be viewed as evidence of inadequate professional training of the manager and his inadequacy for the post he occupies.

In order to improve quality and to raise the engineering level of coal machinebuilding output radically, it is planned to develop a specific-purpose comprehensive program, which will call for:

- a rise in the degree to which production is technically equipped by improving existing and by using new and progressive technology, by introducing resources for the mechanization and automation of production processes, and by improving work organization and certifying workplaces;

- the certification of output and of operating processes, during which measures for raising the quality of machinery and processes are to be developed and implemented;

- the organization of work to introduce comprehensive systems for controlling output quality (KKS SPP);

- improvement of metrological support for production;

- improvement of the work of engineering-inspection sections at plants;

- a rise in the effectiveness of departmental control over output quality on the part of the VPI Sovuzuglemash staff and of those who order the equipment; and

- expansion and improvement of the system of specialized technical servicing of mining equipment by Spets-Sluzhby Sluzhivaniye [Special Mine-Equipment Servicing Administration] and by the manufacturing plants.

In order to raise the technical level and quality of mine-automation equipment, work on modernizing the output produced (with a view to updating more than 50 percent of the items), on creating progressive means for automation with use of the newest electronics base, including microprocessor equipment, and on improving technically the in-house production and experimental-test base by reequipping plants, and also by rebuilding them, have been included in 1986-1990 plans for new equipment for Soyuzugleavtomatika institutes and plants.

It is planned to master the industrial production of new models of mine-rescue equipment (about 40 items) during the 12th Five-Year Plan. The newly



developed output, whose production is being mastered, will be on a par with the world's best.

Coal industry workers are accepting party and government decisions on a radical rise in output quality as a personal matter that is vitally important to them. During the first 8 months of 1986 all the indicators for fuel quality were improved, and the ash content of the coal that had been mined and shipped was reduced throughout the industry in comparison with 1985. Production associations ensured the shipment to the national economy of coal whose ash content corresponded to the norms of the specifications.

Universal improvement of output quality is an important direction for increasing the effectiveness of social production and for realizing the party's policy of accelerating the country's social and economic development.

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# COAL QUALITY IMPROVEMENT CALLED FOR IN CURRENT FYP

Moscow UGOL in Russian No 10, Oct 86 pp 20-22

[Article by Candidate of Engineering Sciences L. V. Zavodchikov (of Tulaugol): "Raising Coal-Output Quality Is the Main Task of the 12th Five-Year Plan"]

[Text] One of the main areas of activity of Tulaugol [Tula Coal-Mining Association] laboring collectives is radical improvement in the quality of the output produced. They have developed steps aimed at a substantial growth during the 12th Five-Year Plan of quality indicators that will surpass those of the preceding five-year plan.

During the 11th Five-Year Plan the plan for processing coal at preparation plants was carried out 106.1 percent by the association, the plan for output of graded coal 135.2 percent; the ash content of the coal mined was reduced 0.1 percent below the plan and 0.2 percent below the standard for coal that is shipped; the amounts of shipped fuel that deviated from the standards was reduced from 429,000 tons in 1980 to 47,000 tons in 1985, or 9-fold; the amount of shipped coal that was rejected was reduced during these same years from 5,700 tons to 800 tons, or 7-fold; and the number of claims was reduced from 26 to 4, or 6-fold.

At the same time, the actual ash content of coal mined during this period rose by 1.9 percent, which is explained by objective factors: termination of the working of low-ash coal seams and transfer to the development of high-ash coal, and a worsening of the mine-geology conditions of the coal's deposition. During the 12th Five-year Plan practically all coal enterprises will bring the outline zones of underground-mine floors into development, since the main central reserves have already been worked out. Outline zones are marked by extensive karstiness of the seam, a large number of petering-out zones, and by pinches and dissection of the seam by rock intercalations. Panels with stratified ash content of coal at the boundary levels of the established requirements will also be developed. Despite this, the association's miners have set themselves the task of reducing the increase in ash content and precluding the shipment of rejectable coal and of coal with deviations from the requirements of the state standards.

The dressing of coal--a basic factor in improving the quality of the coal shipped--is being developed in the association at a rapid pace. Preparation plants at the Kimovskiy Strip Mine now are being operated with an annual productive capacity of 1.1 million tons, with dressing in heavy medium, and

at the Vladimirskaia Underground Mine, of 1.4 million tons capacity, with pneumatic dressing. The preparation plant at the Nikulinskaya Underground Mine, with a design capacity of 2,100 tons per year, was turned over for operation in the first half of this year. A preparation plant of 2,100 tons-per-year capacity is being erected at the Afanasyevskaya Underground Mine, which is under construction.

The volume of coal processing at preparation plants increased 648,000 tons in 1985 over 1980. Dressing covers 20.2 percent of all the coal mined. These results were achieved thanks to the introduction into operation of the preparation plant at the Vladimirskaia mine and the organization of coal haulage from the Ushakovskiy Strip Mine to the Kimovskiy Strip Mine's preparation plant. It is planned that coal processing at preparation plants will increase in 1990 by 920,000-940,000 tons over 1985. Dressing will cover 34-35 percent of all the coal mined.

The qualitative indicators of dressing also are to be improved. Thanks to the introduction of scientific and technical developments by IOFT [Institute for the Dressing of Solid Mineral Fuels], it is planned to increase concentrate output to 84.5 percent during the 12th Five-Year Plan. The SP-12A pneumatic separator, of 150 tons/hr productivity, is now being installed at the Vladimirskaia mine's preparation plant. The SARP-1 system for automated regulation of the dressing process is being tested and introduced there. At the Kimovskiy Strip Mine's preparation plant the RUTA installation is being introduced for the automated regulation of suspension density. The operating technology for coal-preparation divisions of the preparation plants is being improved with the introduction of an additional crushing stage at the Vladimirskaia mine's plant and by an increase in the intensity of screening at the Kimovskiy mine's preparation plant. Also being improved is the system for catching process dust at the Vladimirskaia mine's plant.

The association has gained positive experience in the comprehensive dressing of coal and accompanying minerals. Thus, at the Kimovskiy Strip Mine's preparation plant, in addition to dressing coal, waste from the dressing is being realized, with preliminary separation into pyrites and clay. The pyrite is used in the smelting of nickel, the clay for producing building brick.

There are, at the same time, a number of unresolved questions. Because of mine-geology conditions that are complicated for excavating, sand inevitably contaminates the coal, and coal that satisfies the requirements for ash content but with a higher content of mineral impurities is produced and stored. The basic method for realizing this fuel is to blend it with pure coal. However, this leads to a reduction in the quality indicators. The development of methods for extracting the sand from the coal must be included in IOFT's plan for research, and the question about creating mobile open-type pneumatic installation of small productivity for dressing coal that comes from storage must be examined. In order to complete introduction of the comprehensive dressing of coal and of the accompanying useful minerals, work on the use of the clay of the preparation plants must be intensified.

The equipment and the technology for mining the fuel affect considerably the quality of the coal mined. The basic direction for reequipping breakage-face work is to introduce IMKM longwall mining machines for excavating thin seams.

The specific share of IMKM longwall miners in the overall pool of mechanized longwall miners in 1980 was 10.6 percent, while in 1985 it was 45 percent. It is planned to bring the shared participation of these longwall miners up to 90 percent by 1990. However, the introduction of mechanized IMKM complexes will not resolve completely the problems of mining coal with minimal wall-rock contamination. The time has come when it is necessary for PNIUI (Moscow Regional Scientific-Research Institute for Coal) staff workers to create a longwall mining machine that will support the excavation of a seam 1.3 meters thick with a broad range of extensibility, will possess great maneuverability and will be adaptable to operation where the hypsometry of the coal seam's deposition is erratic.

An absence of reliable, maneuverable lightweight supports for longwall junctions with an entry also is telling. GRS and T-6 junction supports have practically not been used. They are being replaced by line sections of complexes that do not provide for minimal contamination of the coal while it is being excavated at the longwalls' end sections. PNIUI should pay more attention to solving this important problem.

The main direction for improving fuel-mining technology is the introduction of selective excavation of coal and rock, and also excavation by two cutter-loaders at longwalls. Coal is excavated selectively at longwalls and developmental faces at meeting taperings of the coal seam. Two-cutter-loader excavation provides for more rapid advance of the longwalls, which precludes contamination of the coal by wall rock. In 1984-1985 the technology of excavating coal with two cutter-loaders was tested at the Vladimirskaaya Underground Mine. This enabled the amounts of coal mined to be greatly increased and its quality to be improved. It is planned to introduce two-cutter-loader excavation of coal at 10 longwalls by the end of the 12th Five-Year Plan.

Technical and technological monitoring of quality of the coal that is mined and shipped plays an important part in improving coal output quality. The level of mechanization of sampling is 32.6 percent for coal that is shipped, 11.1 percent for the coal that is mined, values which clearly are not adequate. It is planned to bring the mechanization level of sampling of shipped and mined coal up to 65 and 45 percent, respectively, during the 12th Five-Year Plan.

Because of the depleting of low-ash reserves and the mining of coal with quality indicators at the marginal level if permissible requirements for excavation and consumption, it has become necessary to expand the preliminary monitoring of coal quality. The latter is to be accomplished by assimilating high-speed methods for determining the ash and moisture content of the coal and introducing chemical analysis by BBA-II analyzers directly at coal enterprises.

Material incentives for improving coal output quality still are not being executed fully by the association. There are no incentives for supervisory, engineering and technician personnel of underground and strip mines, preparation plants and associations to improve coal-output quality, to increase the amount of coal that is dressed and graded in order to raise the output of concentrated and graded coal, and to introduce and expand waste-free production

during coal dressing. An increase in bonuses of up to 25 percent for breakage section workers and of up to 10 percent for workers of certain other categories is inadequate.

Thus, the Lipaevskaya Underground Mine fulfilled the coal-mining plan for the first quarter of 1986 and all the technical and economic indicators and received additional profit in the amount of 70,000 rubles by improving the quality and grading of coal, but the bonuses for improving coal quality were paid out only in the amount of 250 rubles. This is explained by the fact that the bonus for improving coal quality is additional and is counted within limits no higher than the maximum allowed to be paid for fulfilling the quantitative indicators. The mine's workers received practically the maximum sum of the bonus for quantitative indicators, which did not permit award of the bonus for meeting the qualitative indicators.

In this connection, it is proposed to develop recommendations on effective incentive awarding for dressing and grading workers, and also for improving coal-output quality. In our view, incentives for improving coal output quality should not depend upon the maximum amount of the bonus paid for achieving production indicators.

A rise in the responsibility of supervisors, engineers, technicians and blue-collar workers for output of poor quality is an important factor in intensifying production discipline. Much has already been done in this area, but there are still reserves and unused measures.

When waste is found in an underground mine, the workers are not paid the corresponding amount for mining, and this amount is not included in production-plan fulfillment. When coal waste is shipped to a customer, the corresponding amount is excluded from fulfillment of the plan for mining and for realization, and the customer is paid a fine in the amount of 20 percent of the coal's cost. However, the expenditures associated with dressing coal rejected at the mine and the sizes of the fine still are not adequately compensated for at the guilty party's expense. Direct contractual ties of coal enterprises with the customer on matters of fuel quality have been tested and, according to an evaluation by the Byazanskaya GOKS, give positive results. However, such ties still have not been used widely. A new form of examining problems of raising coal quality and of improving coal use, at a standing conference with the participation of the coal workers, the customers, representatives of coal-marketing and local standards (State Committee for Standards) organizations, and scientific-research institutes, has been tested.

The organization of socialist competition to improve coal output quality calls for the introduction of a comprehensive form of competition, which embraces a large number of competing subunits, a complete list of the basic indicators and the indicators considered, with mandatory consideration of the indicators of and measures for improving the quality of the coal, including an assessment of its quality by the customer and by monitoring organizations. It is planned to disseminate everywhere during the 11th Five-Year Plan this form of competition, which has been organized among underground mines, preparation plants, breakage sections, shifts of breakage sections and preparation plants, technical monitoring sections and chemical laboratories.



The integrated system for controlling coal output quality (KSUKPugol) was introduced on the basis of the standards for enterprises that were developed by the associations. USSR Minugleprom has now developed typical standards for underground and strip mines and preparation plants. In 1987 the association plans to complete the introduction of a comprehensive system that will enable coal-output quality to be controlled under optimal operating conditions.

In addition to fulfilling the basic measures, other measures are being developed for improving coal output quality: improvement of methods for drying and for geophysical exploration; the blending of coal during loading; improvement of schemes for the surface support complexes and developmental complexes; the drive against congealability; the removal of metal and the wide introduction of standardization, norm-setting, planning and reporting; certification of workplaces; exchange of advanced experience; improvement of working conditions; and so on.

As a result of intensifying the work to improve coal output quality by 1990, the following are called for: the shipment of coal waste and of coal with deviations from the standards are to be eliminated; the amount of coal shipped with an ash content of 40-45 percent is to be reduced; the rate of increase in the mined coal's ash content is to be reduced from 1.9 to 1.7 percent; the ash content of coal shipped is to be stabilized; and the ash content of large and medium-size grades of coal is to be reduced 4 percent.

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## ECONOMIC PROBLEMS IN RAISING COAL QUALITY

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[Article by Candidate of Engineering Sciences K. K. Kollodiy (TsNIEIugol)]

[Text] By way of discussion.

The Main Directions for the Economic and Social Development of the USSR for 1986-1990 and for the Period up to the Year 2000 calls for an improvement in coal quality output, an increase in the amount of coal dressed, and an expansion in the production of concentrate and of graded fuel and briquettes for municipal purposes and everyday-living needs. The tasks set for the industry in the area of raising coal output quality require much restructuring of economics work. A retrospective analysis has indicated that, while the amount of mining and processing of coal has grown continuously in the past 20 years, the ash content of the coal mined, shipped and used in the national economy has risen continuously during this period. Only the ash content of coking-coal concentrates has remained stable (see the table).

Year	Ash content of coal mined, %		Ash content of coal shipped, %	Ash content of coal dressed at preparation plants, %		Ash content of concentrate, %	
	Estimated	Actual*		Estimated	Actual	Coking coal	Steam coal
1965	21.6	21.8	19.3	22.4	23.1	7.9	12.0
1975	23.3	25.6	20.2	24.6	29.8	7.9	13.9
1980	24.9	27.8	21.6	26.2	32.8	8.0	15.1
1985	26.7	30.3	22.8	28.3	35.7	8.2	17.0

\*The actual ash content is calculated to take into account rock that is not counted in the coal mined and processed.

The main causes for the increase in the ash content of the coal mined, especially in the past decade, were the development of high-ash seams; the high rate of introduction of narrow-front equipment; and a worsening of the mine-geology conditions for excavation. The rise in ash content of the coal shipped and of the coal used in the national economy is caused almost exclusively by the reduction in the rate of increase of mechanical dressing, and also by inadequately intense dressing of steam coal at old preparation plants, where high-ash screenings and culm are not dressed.

The reduction in quality of the coal shipped to the national economy cannot help but be reflected in the economics of the coal industry, which is subsidized, more than 50 percent of the planned losses being associated with coal quality. The so-called "settlement prices" introduced in 1986 did not change the actual state of affairs. Because of low quality of the coal, absorption losses are being formed, and an annual reduction in the realization cost per ton of coal is occurring. A reduction in the production work and output of large and medium grades of coal and of anthracite are causing much harm to the industry's economics. During the past 10 years, the production of graded coal fell short more than 55 million tons, including 13 million tons of graded anthracite, because of a reduction in the industry's output alone.

The burning of large and medium-size grades of coal in fireboxes for bed combustion is 2-fold to 2.5-fold more effective than the burning of run-of-mine coal. The national economy is experiencing a great shortage of this type of fuel. Reduction in its output is reflected painfully in the branch's economics. Reserves for increasing the production of high-quality coal are incorporated in the wider introduction of large spallation-type mining equipment, primarily of large-lump excavating machinery for underground mining and high-capacity excavators for open-pit work.

In all cases the mandatory processes are the mechanical dressing and grading of coal, as well as the use at surface operating complexes, preparation plants and storages of ordinary methods for reducing the coal's degree of grindability. Kemerovugol [Kemerovo Coal-Mining Association] strip mines are still the sole source for quantitative growth in the output of high-quality graded coal, provided that coal preparation plants are constructed there.

Expansion of the production of large-lump fuel by briquetting requires a 6.1-fold rise in operational costs and a 4-fold to 5-fold rise in capital costs in comparison with coal dressing at preparation plants. Therefore, in each specific case, the question about erecting new briquetting plants must be examined after an appropriate feasibility study.

The conversion of boilers from bed burning to pulverized burning and fluid-bed burning can be a great reserve for reducing the requirement (by 18-25 percent) for graded coal with a simultaneous rise in the utilization effectiveness of coal resources. The last two types of burning enable the boilers' efficiency to be raised 25-35 percent over bed-burning fireboxes. Moreover, with pulverized burning, highly effective use can be made of low-calorie and high-ash coals. The burning of high-ash coal in a fluidized bed in accordance with the Dombas [Donets Coal Basin] experience can also be a reserve for saving graded coal.

What does the continuous degradation of coal quality mean to the industry and to the national economy?

For the coal industry it means annual and ever-increasing planned losses, covered by subsidies from the state budget; difficulties with the marketing of run-of-mine coal in the Moscow-area and Karaganda basins and by Bashkirugol [Bashkir Coal-Mining Association] and Aleksandriyugol [Aleksandriya Coal-Mining Association], and also with high-ash coals of the Dombas and slurries from preparation plants. (The total amount of low-quality coal (low-

customers periodically refuse is at present 10-15 million tons); the necessity for obtaining annual authorization to ship coal with deviations from the GOST's [State All-Union Standards] (the total amount of coal shipped with deviations from the standards' requirements is 9 percent of the total amount); delays in loading coal and the fines occasioned thereby for idle time of railroad cars; and reduction in the realization cost of 1 ton of coal (in 1985 the cost of the fuel was reduced from 13 rubles 48 kopecks to 12 rubles 36 kopecks, or by 9.1 percent, in comparison with 1982). For the national economy this is a reduction, despite the increase in mining, in total heat of combustion (in tons of standard fuel equivalent) of the coal, that is, of the resources for consumption; a reduction of several billion kWh per year in the generation of electricity, and the burning of 15 million tons of scarce mazut instead of coal in boilers; annual losses of 12-14 million tons of coal because of the use of bed burning of run-of-mine coal instead of graded coal in fireboxes; irrational transport haulage of country rock together with the coal; and pollution of the environment.

Aside from the material harm inflicted on the national economy, degradation of coal quality provokes numerous customer claims. However, are these claims fair in all cases?

Is reduction of ash content always efficient for the national economy?

Unlike other types of output, the generally accepted concepts of quality cannot be applied to coal, since, being an industrial raw material and a fuel, it is not the final product of consumption. Also, one must not compare the waste of ordinary output with coal waste by virtue of the fact that coal of any quality (ash content) can be burned (used), but with less benefit, while many types of other defective output cannot be used at all until the defect is eliminated. It should be considered in this case that, in order to make industrial use of coal in certain processes (coking, coal gasification, and so on) the coal should be cleaned of rock, otherwise these processes cannot proceed in normal fashion. However, the degree of reduction of ash content relative to these industrial processes should be determined by the material expenditures on production of the final output (1 ton of pig iron, 1 m<sup>3</sup> of gas, and so on). For coal that is used as a fuel, the final outputs are 1 kWh of switchboard power, 1 ton of steam of prescribed parameters, 1 GJ of heat, and so on. Especially urgent is the question of the quality of the coal sold to the populace for individual fireboxes and furnaces. However, even here the coal's optimal ash content should be determined.

From what has been said above, the conclusion can be drawn that coal quality is a basic economic category, since the qualitative parameters can be improved to practically any values (within the limits of the source's ash content) by mechanical dressing of the coal or as a result of other types of processing, but the costs, in so doing, will not be compensated for at the use stage. Because of this, an optimal indicator (according to a national-economic criterion) of coal quality must be computed, that is, the minimal expenditures at its production and consumption stages must be determined in order to obtain a unit of final output.

For example, the optimal coal quality for pulverized burning can be determined on the basis of a calculation of the coal and power industries' expenditures for mining, dressing, transporting and burning coal of various qualities, at which the prime production cost and the adjusted expenditures for

generating 1 kWh of electricity will be minimal. The optimizing calculations should consider the technical possibilities of the heating units and industrial processes where coal is used as a fuel or raw material. Nor should the requirements for coal quality be forgotten from the point of view of protecting the environment. Finally, the optimized calculations should be carried out to take into account the completeness of the extraction of the coal from the ground, that is, making rational use of the coal reserves.

Studies conducted jointly with USSR Minenergo [Ministry of Power and Electrification] scientific-research institutes of the amounts of the annual economic benefit to the national economy by obtaining and using coal of optimal quality for pulverized burning have indicated that it is extremely great. Thus, it is 24.7 million rubles for Moscow basin coal, 83 million for Donetsk basin coal and 31 million for Kuznetsk basin coal). Something should be said here about the existing requirements (as to ash content and thickness) for coal seams. The limiting values thereof for many underground and strip mines were established long (10-20 years) ago and at that time the extent of the effect of modern mining equipment and the radical changes that have been occurring in dressing equipment and technology could not be considered. Unfortunately, the procedure for establishing the requirements are still the same as they were before, in some cases. Thus, seams less than 2 meters thick were applied by Kemerovougol when it set the thickness requirements for quality-unstandardized coal at strip mines. The practice that now exists that prohibits in all cases the working of seams that are not quality standardized is not justified economically.

As the calculations indicated, the use of special measures (the working only of seams that are efficient and are low in ash, the refusal to excavate so-called "uneconomical reserves" and seams that are not quality standardized as to ash content and thickness, the separate excavation of coal and rock when doing developmental work in underground mines, the selective mining of coal at strip mines, and so on) for reducing the coal's ash content during mining are 6-fold to 10-fold more expensive than improving the quality of the fuel while dressing it. It has also been established that organizing the mining and dressing of the coal that is lost in the ground and at the dumps is 4-fold to 8-fold and 1.2-fold to 2-fold less expensive in terms of, respectively, capital expenditures and adjusted expenditures than is the erection of new or the rebuilding of existing coal-mining enterprises, based upon similar capacity.

The necessity for operating the coal industry with a state subsidy results from both intraindustry deficiencies (including those that concern coal output quality) and from the prices for the coal, which do not cover the actual expenditures for mining and processing it. Moreover, the computed ash content of run-of-mine coal in the price list is extremely understated, while the list of wholesale prices for coal output introduced in 1982 was, in our view, erroneously oriented to a greater extent toward a rise in prices for run-of-mine coal than it was for dressed coal.

The price list that was made up in this fashion was basically incorrect, and in 1983 the industry again became unprofitable. Moreover, even the "Dressing" subindustry, which had always been profitable, was among those that lost money. A similar error, in our view, was also committed during the 1986 conversion of the coal industry to settlement prices where the



profitability (or the profit) for run-of-mine coals was planned to be 25 percent, but only 5 percent for dressed commodity output. At the same time, the quality of mined (run-of-mine) coal deteriorated continuously while that of dressed coal remained stable or it improved. This situation will not change over the long term.

It should also be noted that, according to the existing price list, the main coal consumers--USSR Minchermet [Ministry of Ferrous Metallurgy] and USSR Minenergo [Ministry of Power and Electrification]--are profitable branches of industry. Therefore, the newly developed price list must, first, be oriented to the norms for optimal ash content, mainly for dressed coal, and, second, the prices must be examined with a view to making a more rational redistribution of profit between coal suppliers and consumers.

Preliminary calculations of the optimal values of coal quality (especially for pulverized burning) have indicated that coal dressing is not required in all cases. The currently existing system for assessing coal-output quality uses ash content as the main indicator. At the same time, while it is more or less objective for coking coals, the ash-content indicator is inadequate for hard steam coal, because it does not characterize with adequate precision the coal's heat value. An assessment of fuel quality according to the heat of combustion is more acceptable here, since this indicator is the integral one, which reflects the content of ash, moisture, fly-ash and sulfur and other parameters upon which the magnitude of heat equivalency depends. Moreover, where there is identical ash content, the heat of combustion of coals of various grades differs considerably, a fact that does not permit quality, cost and heat usefulness to be evaluated objectively. With gradual conversion to evaluating steam coal quality by combustion heat, all other quality indicators (content of ash, moisture, mineral impurities and fly-ash, the grade composition, and so on) should be excluded as defective and should serve only as information for boiler design and operation.

One of the important omissions in the way of improving coal output quality is the concentration of the main attention on questions of raising the quality of the coal mined and the underestimation, in this connection, of the value of developing coal dressing ahead of it. This is explained by the dual (separate) system for planning commodity output for mined coal and dressed coal. Such a situation, as many years of experience have indicated, has not led to an improvement in the quality of mined coal, but, it has, on the contrary, caused a continuous increase in ash content. A reduction in the rate of growth of coal dressing has affected adversely the quality of the fuel shipped, where a rise in the fuel's ash content also has been noted.

The rate of increase in the ash content of mined fuel undoubtedly must be reduced, but such measures should be accomplished primarily for coal that is shipped without being dressed. In this connection, the ash content of mined coal should be planned differentially as a function of the conditions of its shipment: with or without dressing. In so doing, it must be kept in mind that a reduction in ash content at the preparation plants, as has already been noted, is much cheaper than carrying out special measures at underground and strip mines. As advanced domestic and foreign experience indicates, the development of mechanical dressing is practically the sole economically effective means everywhere for improving the quality of the

coal that has been mined and for shipping it to the national economy with optimal ash content or heat of combustion.

In speaking about the economic problems of raising coal quality, the imperfection of the existing system for reporting on the processing of and settlements between underground and strip mines and preparation plants, for mined run-of-mine coal should be noted. This system does not consider the actual processing of coal at the preparation plant, which in 1985 exceeded the reported amount by 31.8 million tons. Such reporting leads to an artificial worsening of the technical and economic indicators for coal dressing: reduction in the level of assimilation of production capacity, growth in the prime cost, overpayments for raw material, reduction in labor productivity, and so on.

It is known that underground and strip mines abroad (including those in the socialist countries) are not required to take special measures to reduce ash content if they are detrimental to the final economic effect, that is, the output of coal of a given quality. Obviously, this experience should be borrowed and applied to the planning and reporting in mining in regard to commodity (final) output. Change of the system of accounting for and planning the mining and processing of coal will enable: coal lost in the ground and in dump heaps to be reduced and, thanks to this, the total amount of mining to be increased; coal resources to be so planned that they equal the amounts mined; discounts on coal from mining to be eliminated; accountability to be regularized; and the system for mutual settlements of the underground mines with the preparation plants to be simplified.

A radical restructuring of the policy being implemented in the area of raising coal output quality is necessary, namely:

the development of a cadastre of optimal coal quality for various requirements, which should be made the basis for norms for consumer standards and price lists;

concentration of the main efforts on the outstripping development of mechanical dressing as practically the only economically effective means for insuring the delivery of optimal quality coal to the national economy;

the development of those measures for reducing contamination of mined coal by rock that will avenge a rise in losses of coal in the ground, as well as a reduction of labor productivity and of the pace of performing developmental excavations in underground mines and of executing stripping operations at strip mines;

the introduction of a new price list for coal that is oriented to achieving profitability for coal dressing, the wide development of which would provide for a gradual conversion of the coal industry to the ranks of the profitable branches of the national economy; and

orientation of the equipment and technology for mining, processing and use of coal to the possibility of producing and using coal output of optimal quality.

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# BLACK SEA HEATS HOMES

Review PRAVDA in Russian 21 Sep 86 p 6

[Article by V. Chertkov, PRAVDA correspondent, Crimean Oblast: "The Sea Heats Homes: An Account of the First Heat-Pumping Plant in the Country"]

[Text] The sea boils up and makes a threatening noise. It rages the embankments of Yalta with an icy wind. It draws up to the dwellings. I look at the room thermometer--21 above. I touch the radiator and, feeling the blessed heat, it somehow seems unbelievable that the room is warmed by the Black Sea, the same sea whose cold drove me from the shore.

This is the way it was last January, when a test was made at the Druzhba boarding house of a new heating system, the first heat-pumping plant in the country. There were some doubts: after all, a sanatorium is not an experimental testing ground. The specialists who proposed the miracle understood: if it happened to be unsuccessful...and they rejected the idea, probably, as often happens.

Although, however, no one discovered America in this case. A pump, as we know, can move anything at all, including heat--from the sea, the air, from any medium. A special pump is needed--a heat-pump. They say that it is a "refrigerator the other way round."

"Here, into this well," A. Kuratsenko, chief of the heat-pumping plant, points to a tower in the middle of the beach. "The water enters from the sea. We take it 100 meters from the shore, at a depth of 28 meters. In winter its temperature is usually about 8 above. We give water with a temperature of 60-65 degrees for the needs of the sanatorium. At the same time, for each kilowatt-hour of energy consumed here, the sea will give three kilowatt-hours."

This, then, is a heat pump. Since it is designed for the needs of the health resort, however, they decided to use ordinary refrigerating equipment instead of it. It is known that a refrigerator "pumps out" heat from its enclosed chamber and throws it out into the environment. Now they have done it in a different way. By passing flows of sea water through a refrigerating unit with freon, heat is drawn from it. The hot steam, formed as the result of

heat exchange, is condensed, the temperature rises to 110 degrees, and then the condensate gives off its heat to the fresh water, which circulates in the heating and heat supply systems.

The VTsSPS [All-Union Central Trade Union Council] and its Soyuzkurortproyekt Organization were undoubtedly bold when they decided to resort to a nontraditional source of energy. Yes, we know that the energy resources in the World Ocean are astronomical. Yet, it is still resorted to very timidly, putting everything off until later. This means that the heat-pumping plant at Yalta, living on energy from the Black Sea, is a step worthy of great attention.

On the basis of the heat-pumping plant for the Druzhba boarding house, the decision has been made to create an experimental-instructional base to train personnel of heat-pumping units.

Beginning in 1987, work should begin on developing design documentation and construction of sanatoriums and boarding houses, hotels and public buildings in the Crimea which use only nontraditional and regenerated sources of energy for their heat supply.

The USSR Ministry of Power and Electrification has proposed the development, in 1987, of a TEO [Fuel-Energy Division] for the construction, in the city of Saki, in Crimean Oblast, of an experimental-industrial complex using nontraditional sources for heat supply in this region of the health resort area (solar electric power plants, heat-pumping units, solar collectors and geothermal systems).

Fire has already absorbed so much coal, gas, wood and mazut that man is already thinking increasingly of the day when the natural resources of customary fuel will be exhausted to the limit. The environment is being polluted, and the concern here is even greater. This is particularly true of the rest and recreation areas.

The Druzhba boarding house saves about 700 tons of conventional fuel a year. One can imagine, although with difficulty, what a cloud of contamination would be formed after burning these 700 tons.

The State Program for Developing Energy for our country until the year 2000 specifies the increasing role of nontraditional sources of energy. In the 12th Five-Year Plan, their power is determined as 4 million kilowatts.

When the Druzhba boarding house existed only on sheets of Whatman drawing paper, Soyuzkurortproyekt also spoke out for a heating-pump plant. Specialists from the All-Union Scientific-Research and Design Institute of the USSR Ministry of Power and Engineering (VNIPIenergoprom) zealously defended its advantages.

"They persuaded them after all," says A. Novokreshcheniy, head of the Sector for Introducing Heat Pumps of the Crimean Division of this institute. "For the time being there was a struggle for the project and for its implementation--and there were many opponents--we tried to do everything so that the idea would not be compromised."

They constructed the plant under complicated conditions. Each meter of the Crimean shoreline is precious, and what is more, the rocky soil does not give free scope to the construction workers. Therefore, the volumes of the plant specified by the plan had to be constricted. The spaces were overloaded with equipment and poor in everyday facilities. The specialists, however, packed everything into the "reduced" square meters, even though this cost more work. Taking in at a glance all these filters, pumps and piston compressors with heat exchange apparatus, I recalled Karstenko's words: "We provide water with a temperature of 60-65 degrees for the needs of the sanatorium."

"Just how, then, is normal heat maintained in the facilities--after all, the water is not hot enough?" I turn to K. Kurdyumova, chief engineer of the boarding house, to whom I was introduced by Yu. Maslovskiy, deputy chairman of the Yalta Territorial Council for Administration of the Trade Union Health Resorts.

"Normal temperature is maintained through increasing the area of the heating systems," answers Kurdyumova.

"If the construction workers," A. Kuratenko joins in the conversation, "would make widescale use of panel heating, for which the temperature of the heat-carrier is only 28-30 degrees, these facilities could be heated by any refrigeration machine. Yes, yes, I will take it upon myself to prove that it is more profitable to obtain heat than cold from a refrigerator! In general, even for ordinary radiator systems, the most optimal temperature of the heat-carrier--both from the economical and the hygienic standpoint--is 55 degrees. The heat is in this case distributed equally throughout the facilities, creating comfortable conditions."

The plant performed its first winter duty from 1 January to 4 April. "Winter is our anxiety" the operations workers say of this period. But there are greater joys. In the three months of the experiment, 1 million kilowatt-hours of energy were obtained from the Black Sea.

There is something new kindling the fire of creativity. Technician A. Furash and mechanics V. Sorokin, V. Lipka and V. Savskey are putting into practice an interesting new idea at the plant: a portable solar battery will be in operation in conjunction with the refrigeration machinery.

In conclusion, it is worthwhile to present the opinion of O. Loboza, deputy chief of the Department of Industrial Refrigeration Units of VNIKhlozmash [All-Union Scientific Research Institute of Refrigeration Machinery]:

"It will be extremely strange if, as is now being done, those who refute the new technology will direct the scientific-production center. I have in mind the directorate of the general health resort builder house, under the jurisdiction of which, through an obvious misunderstanding, the heating-pump plant finds itself."

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## FUELS

### BRIEFS

**CEMENT FOR HIGH TEMPERATURES**--Krasnodar, 20 [Aug]--Specialists from the All-Union Scientific Research Institute for Well Reinforcement and Drilling Mud proposed a cement which retains its strength at high temperatures. As is known, oil extraction workers must use hot steam to raise the valuable raw material to the surface. Cement, however, which is used to reinforce the wells, does not withstand high temperatures. Scientists have now succeeded in solving this problem. The new cement passed its test with a mark of excellent. The first batch of this building material was manufactured at the Konstantinovskiy Weighting Compound Plant and sent off to the oilmen. [By Road of the Printing Sector of the CPSU Krasnodar Y. Smeyakha] [Text] [Moscow PRAVDA in Russian 21 Aug 86 p 2] 12151

**SUBMERSIBLE WILDFIELD ENGINE DEVELOPED**--Kutaisi--New models of unitized submersible engines which the collective of the Kutaisi Electromechanical Plant has begun to produce will increase oil extraction. The special features of operating them under the low temperature conditions in the oilfields of Tyumen Oblast were taken into consideration in the design and technological decisions for the machines. The operational resource of these electric engines is almost double that of those produced earlier. The enterprise will manufacture several hundred of the new submersible engine before the end of this year. [Text] [Moscow SELSKAYA ZHIZN in Russian 19 Oct 86 p 1] 12151

**NEW COAL MINING COMPLEX**--Izba, 31 [Aug]--The State Commission signed an act on putting into operation the first start-up complex with a yearly capacity of 600,000 tons of coal at the Nikulinskaya mine. The basic labor-intensive processes will be mechanized and automated here. During comprehensive testing of the equipment up to the surface, the first hundreds of tons of fuel were mined. After construction completion, the capacity of the Nikulinskaya mine will exceed 2 million tons of coal a year. [By PRAVDA stringer N. Makharinets] [Text] [Moscow PRAVDA in Russian 1 Sep 86 p 1] 12151

**TUNNELING COMBINE FOR ARCTIC**--Yasikovskaya (Imenak Oblast), 22 [Oct] (TASIS)--Tunneling combines, the output of which is organized at the Yasikovskiy Machine Building Plant (Imenak 60-letie SSSR, can "get their teeth into" permafrost. In the full sense of the term. Today the enterprise completed the shipping of this unit to the Vorkutaugh Association. [Text] [Moscow PRAVDA in Russian 23 Oct 86 p 2] 12151

NEW OPEN PIT MINE--Krasnoyarskii Krai -- The first hundreds of tons of coal have been sent to consumers from the new open pit mine, Pereyaslayukly (KATER) [Kansk-Achinsk Fuel-Energy Complex]. It is located not far from the open pit mine Srodinakiy, the largest in operation. Creating the new extracting enterprise with a capacity of 100,000 tons of coal a year will free its neighbor from hundreds of small consumers and will make it possible to organize their more precise supply of fuel. Before the end of the year 10,000 tons of coal will be shipped from here to the cities and settlements of Krasnoyarskii Krai. [Text] [Moscow SOYETSKAYA MISTYA in Russian 18 Oct 86 p 1] (215)

KARAKUMI GAS FIELD DEVELOPMENT--TASIK--The gas received in working the field of Malaya in the eastern Karakumy has begun to enter the mainline Central Asia-Center. The construction of the gas fields in Karakumy work under complicated conditions: everything must be delivered here over hundreds of kilometers. Even so, the deposit was developed in a short time. An access highway, water conduit and power lines were laid earlier across the sand dunes to Malaya, and a well-appointed work-stay settlement has been constructed here. Many unit assemblies for the gas-extracting complex have already been delivered to the field assembled and installed with enlarged blocks. Brigade contracting is widespread in the construction worker collections. Five billion cubic meters of fuel will be sent from here to the European part of the country every year. When the field comes to planned capacity, the gas supply will double. [Text] [Moscow DZVONICHESKAYA GAZETA in Russian 30 Oct 86 p 3] (215)

GAS DEPOSIT IN TURKMENIYA--Gardineh--The major new deposit at Malaya in Turkmenistan has yielded its first industrial gas. The streams of "blue fuel" from the gas stores discovered in the desert flowed into a river of fuel running along the pipeline system Central Asia-Center. Geologists discovered the beds in the last five-year plan. Not much time has passed, and already the first stage of drilling out and building up this deposit is completed. The first unit for complete preparation of gas, with a capacity of 1 billion cubic meters of gas a year, has been put into operation. Construction of a second similar unit is in progress. [Text] [Moscow IZVESTIYA in Russian 3 Oct 86 p 1] (215)

OIL WELL EQUIPMENT TESTED--Groznyy (Kavkaz)--Equipment, new in principle, for extraction of extremely important energy raw material at a deposit with emergency blow-outs and gas-lift operation, a Christmas tree and tubing head and various models of underground and surface equipment of domestic make to protect against corrosion and to combat paraffin are being tested at the Aktyubinskii Oil and Gas Extracting Administration of the Aktyubinskii Association. All this equipment is designed for highly efficient and safe operation of oil wells. The equipment and units tested are already being used successfully. [Text] [Izvestiya Vostochnoyazovskoy Pravdy in Russian 28 Sep 86 p 1] (215)

**EKBASTUZ COAL MINE INNOVATIONS**--The first section of the Vostochnyy open-pit coal mine has exceeded the planned capacity by a factor of 1.5. The miners of the youngest enterprise in the Ekibastuz basin, having attained the 10 million-ton mark of coal since the start of operations, completed the shipping of fuel for the year's assignment ahead of schedule. The increased commitment in honor of the Great October holiday was thus fulfilled. The chief special feature of this open-pit mine is a system of continuous conveyers, along which the coal is brought to the surface. The innovators changed the design of the conveyor and receiving hoppers, thus accelerating the movement of the conveyor belts. They correspondingly increased the speed of extracting the fuel and also the rotary excavators. All the equipment for the open-pit mine is now operating in a unified, accelerated system. Every day the miners ship at least 40,000 tons of coal--this is one and a half times the norm. By the end of the five-year plan, through introducing two more sections of the Vostochnyy, as well as by modernizing the Bogatyr, extraction in the basin will reach 100 million tons a year. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian 50 X, 4 Oct 86 p 3] 12131

**AUTOMATING UNDERGROUND OIL BEDS**--Leningrad ASSR--Hardly a minute had passed when the cage delivered us to a depth of several hundred meters. Another short trip along the underground galleries--and we approach the central oil-pumping station.... The famous oil mine No 1, which yielded its first industrial oil in October 1970, is now being modernized. "The future of thermal mine technology is promising," V. Mishakov, senior employee of the Leningrad Association, comments. "By the year 2000 another three oil-extracting complexes will be added to the three existing ones. The end goal of the modernization is the formation of automated underground sections." Thermal mine technology, for its further development, needs a serious scientific, technical and technological guarantee. A great deal is being done for this today. The Azerbaijan Institute Khimneftkhimavtomat designed pneumatic controlling units to automate the withdrawal of liquid in accordance with an assigned program, manufactured and turned over to the oil mine administration four of these units, to each of which 10 groups of wells could be hooked up. Using them will make it possible to reduce the loss of the steam pumped into the bed, improve work conditions, raise its productivity and reduce the periods for developing underground beds. [By E. Levin] [Text] [Moscow IZVESTIYA in Russian 19 193 86 p 1] 12132

**VANBORO DEPOSIT REVEALS ABUNDANCE**--Tyumen Oblast--The new Artyk deposit--Fakhor--has yielded gas. The first news appeared in the dispatching of the Vankorggandshchik Production association. This occurred considerably earlier than the stated deadlines. The advance was achieved through using large skid-mounts, the production of which was organized at the Tyumen Association Stankomplektyentiazh. Skid-mounts are huge rides, filled with all the necessary equipment. Work-unit units for complete gas preparation are likewise being assembled from them at the deposit itself. "The entire increase in gas production in the 12th Five-Year Plan is to be obtained by virtue of the Vankorg deposit," says S. Fashin, general director of Vankorggandshchik. "First, responsibly work lies ahead. We must build up this gigantic Artyk skid-mount and put into operation 10 units for complete gas preparation. Six large gas pipelines will begin their route from here." [By A. Trusov] [Text] [Moscow IZVESTIYA in Russian 23 Sep 86 p 1] 12133

**PUMPS AND OPERATIONS IMPROVE**--Tyumen--After a long delay, the collective of Glavtyumenneftegaz reached the planned indicator for daily oil extraction: over 900,000 tons of hydrocarbon raw material a day are sent from here to the country's processing plants. The success was achieved due to correct distribution of forces. Work under the new conditions required a radical rearrangement of the fields, introduction of additional capacities and rejection of obsolete forms of management. Samotlor, which daily supplies thousands of tons of refined fuel above the assignment, has again found its work rhythm. The field workers at Surgut and Nefteyugansk are assuredly increasing the extraction. The drillers are performing in shuck work fashion, having constructed 360 high-yield wells above the plan. "Only the first milestone has been reached so far, however. A great deal of effort is still to be applied in order to settle the debt to the country," said V. Grayer, said deputy minister of the Petroleum Industry, chief of Glavtyumenneftegaz. "A triumph work front is expected from the oil field workers." [Text] [Kiev NABUCHAYA GAZETA in Russian 10 Sep 56 p 1] 17151

**NATURAL GAS PRODUCTION CELEBRATED**--Vilnius, 8 Sep 1956--Soviet Lithuania now receives almost 3 billion cubic meters of natural gas daily. Industrial enterprises, municipal services, personal services, agriculture, almost 90 percent of the population use "blue fuel". In this five-year plan the natural gas production will increase to 7-8 billion cubic meters a year, new main gas pipelines will be laid and Kedarnyay, Shaknyay, Prenay, Kapsukas and Rytshay will obtain natural gas. These facts were set forth at the ceremonial meeting held today at the Palace of Culture and Sports of the Ministry of Internal Affairs, devoted to the Day of Workers in the oil and gas industry. Ch. Kravkuskas, chairman of the State Committee of the Lithuanian SSR on Lignite and Coal, said: "On the 25th route for supplying the Republic with Natural Gas and on the tasks of the workers in Gas Services in the light of the decisions of the 15th CPSU Congress." A. Brazauskas, secretary of the Central Committee of the Communist Party of Lithuania, congratulated those assembled on the festive occasion. He delivered state awards in the group of gas industry workers. A. Bakula, head of the Division for Construction and Municipal Management of the Lithuanian Communist Party Central Committee and other responsible workers and Soviet workers attended the festive meeting. [Text] [Vilnius SPAKSAUS LITVA in Russian 7 Sep 56 p 1] 17151

**UP-17 GAS EXTRACTION**--Nizhnyatursk--The new underground storehouse of "blue gold" has been put into operation in Western Siberia--the UP-17/18/19. This is the eighth above-plan oil deposit turned over for operation by the construction and installation subdivisions of the Ministry of Construction of Petroleum and Gas Industry Enterprises in the region. Laid in the extraction region at the same time were about 4000 kilometers of field pipelines, which is a thousand kilometers more than in the corresponding period last year. The most important construction project has been completed recently at the famous Komarovo deposit--a compressor station for the gas-lift system of oil extraction. It serves several wells that have already lost the ability to pump oil to the surface, wells with low bed pressure can again acquire an efficient and capable increase their productivity. Development of the advanced wells method was specified by the resolutions of the 21st Party Congress. On

new compressor station was constructed in advance of the deadlines by the comprehensive general contracting brigade of N. Nezhdanov, hero of Socialist Labor and deputy of the RSFSR Supreme Soviet. The work mode of the apparatus and mechanisms of the gas-lift unit, equipped with domestic assemblies, is determined by electronic computer. It regulates the feed of gas into the bed. [By B. Lvov] [Text] [Moscow IZVESTIYA in Russian 2 Aug 86 p 1] 12151

CASPIAN OIL EXTRACTION DEVELOPMENT--Turkmen SSR--Almost 3500 tons of oil and over 40 million cubic meters of gas taken from the depths of the Caspian Sea--these are the figures for above-plan extraction that the operators of the Chelekenmorneftegazprom Association will record any day now in their logs. While increasing the volumes of deep-sea drilling and raising the geological and economic efficiency of the prospecting, they do not forget here, it would seem, about the use of the marine wells that they have depleted. Not long ago, for example, a powerful regulated gusher of oil was struck from a well in the Banka Lam deposit, which had recently undergone major repairs. Now it yields daily, from a depth of over three kilometers, about 25 tons of oil and 40,000 cubic meters of gas. "In the future we intend to bring extraction of oil from the depths of the Caspian to a million tons," says A. Amanov, chief engineer of the Chelekenmorneftegazprom Association. "A major program for constructing a marine drilling base is being carried out at the association's marine operations. Construction of a housing complex, which will accommodate the oil and gas extraction workers of the association, is being carried out here with the use of intensive methods. Putting it into operation will make possible efficient use of the work-stint method of extracting fuel, successful capital repair and service for drilling operations at the Caspian shelf. [By IZVESTIYA correspondent V. Kuleshov] [Text] [Moscow IZVESTIYA in Russian 10 Sep 86 p 1] 12151

DEEP BED OIL STIMULATION--Bitumen obtained in the process of oil refining can serve as an effective medium to increase its flow from low-productive flooded wells. This scientific proposal from scientists of the Ivano-Frankovskiy Institute of Oil and Gas has been confirmed in practice in the course of using the new technology that they have developed. Prolonged working depletes the oil wells and entire deposits. Even though about 60 percent of the valuable raw material remains in them, they cease to gush. In order to make productive beds yield more fuel, it is necessary to pump water to the depth and treat the critical sections with various emulsions and polymers. All these stimulating operations, however, are, as a rule, expensive and give a negligible addition. With what and how can the deep beds be affected? V.S. Boyko, director of development and candidate of technical sciences tells us. "Special mixtures are fed into the well, and these bituminous compositions create favorable conditions in the bed for pumping out the oil." In the opinion of specialists, the new technological method is inexpensive, and traditional equipment is used to put it into effect. The innovation can be introduced at oil fields in Western Siberia, Belorussia, Checheno-Ingushetiya and in other oil-bearing regions of the country. [By T. Larina and R. Fabrika] [Text] [Kiev PRAVDA UKRAINY in Russian 1 Oct 86 p 1] 12151

CSO: 1822/044



## ELECTRIC POWER GENERATION

### OFFICIAL URGES GREATER ATTENTION TO LOW-POWER GES CONSTRUCTION

Tbilisi ZARYA VOSTOKA in Russian 12 Jul 86 p 2

[Article by Sergo Garibashvili, senior specialist, department of industry, Georgian SSR State Committee on Science and Technology: "Awaiting Its Time," "Problems in the Development of Small-Scale Hydroelectric Power-Generating Capacity in the Republic"]

[Text] Of the republic's overall hydroelectric power-generating potential, small-scale hydroelectric plants account for almost half. The exploitation of these resources is a matter of great interest for the national economy and coincides with the objectives of the 27th Congress of the CPSU and the June (1986) plenum of the CPSU Central Committee: maximum fuel economies and the generation of low-cost electric power. The 3d Plenum of the Central Committee of the Communist Party of Georgia also gave serious attention to matters concerning the fuel-energy complex, particularly to electric power component. Underlined here was the fact that the past 15 years or so have seen virtually no additions to capacity at our central electric power plants.

Of particular importance is the need to electrify our remote mountain areas, such, for example, as Svaneti, Tusheti, Khevsureti and others, areas in which the small-scale hydroelectric power plant is also becoming increasingly important socially, from the point of view, that is, of the desire to avoid the problem of the migration of the population of these areas. It should be observed here at the outset that to electrify these regions by drawing via electric power lines from the power grid is not a reliable solution in the winter and entails major material outlays as well, while electrification by means of diesel-power plants is not an efficient scheme either because of the short supply of fuel and difficulties involved in transporting it.

Occupied by the development of large-scale power-generation schemes and the construction of large, central nuclear, thermal and hydroelectric power plants, the attention of the experts to small-scale hydroelectric power generation has flagged seriously, while the construction of small GES was ultimately brought to a halt.

Our republic can look back on a rich tradition of hydroelectric power plant construction and operation, a tradition on which more than one generation of important power-engineering experts has been nourished. Suffice it to point out that between 1925 and 1960 more than 200 small hydroelectric plants were brought into operation within the Georgian SSR, most of them subsequently, however, being taken out of operation and preserved, nationalized or simply written off. The biggest part of them are no longer in satisfactory operating condition and now require restoration and modernization. The small GES still in operation are currently generating somewhere in the neighborhood of 300 million kWh of electric power a year. It is therefore becoming entirely obvious that the problem of developing its small-scale hydroelectric power-generating capacities has become a problem of considerable urgency for the republic.

In April 1983 the council on science and engineering of the USSR State Committee on Science and Technology arrived at a decision. It outlined a program of concrete steps to be taken by specific ministries and agencies. The USSR Ministry of Power and Electrification was given the primary responsibility for directing the work on this problem. It was also recommended that an engineering economic report be prepared and submitted on the development of small-scale hydroelectric power-generating capacity within the country to the year 2000 along with a draft of a program of constructing small-scale central GES both during the Twelfth Five-Year-Plan period and over the course of the remainder of the century. The USSR State Committee on Science and Technology itself assumed responsibility for overseeing implementation of this decision.

Implementation of the program outlined for the Twelfth Five-Year-Plan period will become possible after 1988, that is, when the pilot models of hydroelectric power-generating equipment of our own manufacture begin coming off the production line. Until then we will be concentrating on bringing existing equipment out of long-term storage and restoring small GES which do not require replacement of their equipment.

Of great interest for us in this connection is the development of small-scale hydroelectric power-generating capacities in the Czechoslovak Socialist Republic and for the following reason: there it has been possible not only to build small GES at an accelerated pace, but also to manufacture a broad range of hydroelectric power-generating equipment that not only pays for itself very quickly but is as good as similar equipment manufactured anywhere else in the world. Czechoslovakia is in a position in which it can export to the USSR either from series production or by special order. In view of the valuable experience gained by the Czech experts in this field, it is essential, in my view, that we establish closer commercial contacts with our colleagues. What is more, in Czechoslovakia we can buy hydroelectric power-generating equipment whose manufacture is not provided for by our own industry.

The the extensive preparatory work undertaken by Gruzglavenergo, the Tbilisi Division of the Gidroyekt Institute, GruzNIIEGS [Georgian Scientific Research Institute of Power Engineering and Hydrotechnical Installations] and other organizations in connection with the R&D aspects of the problem, the small-scale GES in our republic have played a very modest role in the program outlining the course of development of the country's hydroelectric power-generating capacity over the Twelfth Five-Year-Plan period and then up to the year 2000. This has evidently been due to the fact that our specialized organizations have not been involved directly in the development of union-level programs for the construction of small GES. And there is an explanation for this: the fact is that we have never been in possession of essential information

concerning efforts under way in the country to solve this problem. So in view of this situation, and because great importance from the point of view of the national economic benefit to be derived is being attached to the development of a small-scale hydroelectric power-generating capacity, the State Committee of the Georgian SSR on Science and Technology has decided to undertake a detailed study of this problem and outline a program of concrete steps to be taken to deal with the situation. This decision has produced a republic-level program designed to advance the development of small-scale hydroelectric power-generation capacities over the period of both the Twelfth Five-Year Plan and the remainder of the century. This program was submitted to the USSR Ministry of Energy and taken as the basis for making some improvements in the union-level program. The section of the program dealing with the restoration and modernization of the country's small central GES, for example, was revised to include for the Twelfth Five-Year-Plan period seven of the republic's small GES together with new automatic power-generating systems with a total installed of some 19 megawatts. This will permit generation of an annual average of something on the order of 100 million kWh of electric power. It was decided at the same time to review plans for three new small GES, Mutso, Omalo and Borzhomi, with a view to including them in the construction program for the Twelfth Five-Year-Plan period. These small GES will have a total capacity of some 13 megawatts and be capable of generating on the order of 70 million kWh annually. So by restoring and modernizing seven small GES and building three new ones we will be providing the republic economy with 170 million kWh a year by the end of the Twelfth Five-Year-Plan period.

Of critical importance for the republic are the organization, planning, design, location, installation, adjustment, operation and maintenance of small GES. The need to solve the problems involved in the most efficient manner possible would, in my view, warrant the creation of a special administration within the Georgian power system. To coordinate on questions associated with the development of small-scale hydroelectric power generation, the republic state committee on science and technology is working closely with specialized organizations within Georgia, the USSR State Committee on Science and Technology and the individual union ministries concerned. Only by combining our efforts this way can we insure the effective functioning of our small GES and thus tap the vast potential represented by the medium and small rivers of Georgia.

8963

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## ELECTRIC POWER GENERATION

### LOW-POWER GES CONSTRUCTION URGED

Kiev PRAVDA UKRAINY in Russian 9, 10 Oct 86

[Article by PRAVDA UKRAINY correspondent T. Nikitin: "Return the Water to Its Former Strength"]

[9 Oct 86 p 2]

[Text] Among the many problems the country faces, the problem of insuring efficient utilization of its natural resources and protecting the environment is one more critical now than at any time in the past. Not least important in this connection is the problem of the preservation and efficient exploitation of our small rivers. They provide moisture to the flood plains and irrigated lands and supply water to the villages, but there was a time when they also turned the turbines of small hydroelectrical power plants.

But what are we going to do for our small rivers? How did the GES built here during the years of the postwar five-year plans come to meet the fate they did? What problems arose in connection with the operation of these plants? These are the subjects we are going to be going into over the course of our discussions.

#### From the Point of View of the Owner

We were standing on the high catwalk at the Kuntsevskaya GES. Far below us, the powerful currents of the Vorskla, foaming, playing in all colors of the rainbow, beat against the supports of the dam. Behind us, the mirror-smooth surface of the reservoir dazzled the eyes. Over to the right, in an orchard workers at the GES had planted, shone the red cheeks on the new autumn apples.

"What a beautiful sight!" Not so much a statement, but more of a sigh from A. M. Tsekhmistrenko, head of the Poltava Integrated Design Department of the Ukrainian Division of the USSR Ministry of Power and Electrification's Selenergoprojekt Institute.

"What a splendid place for fish and birds. Yes, and for animals, too. Look over there. There's a little fellow right there next to the building. A muskrat. He's



being on the cautious side, but he's not paying any attention to us. He's obviously gotten accustomed to the peace and quiet around here....

And then he suddenly steered our conversation onto another subject:

"I was headed back home not too long ago, to the village of Lutishche, on the Smushchine in Akhtyrskiy Rayon. When anybody shows up there now, they always make it a point to mention that they got their heat in a year ahead of schedule. But in addition to the heat, I also felt some bitterness.... Not long before I left, an entire delegation came to see me. Most of these people were old-timers in the village. It took them a while to get past the beating-around-the-bush stage. They talked about how this used to be and then about how that used to be and so on. And then, they said, just think of the beautiful grassy meadows we used to have around here! What grass! Do you remember our Skelskaya power plant? What do you mean, do I remember the power plant we used to have, I say. If it hadn't been for that power plant I wouldn't have taken the path I did. And that's precisely why we came, they say. We heard, they say, that you've been building power plants yourself now and hobnob with the bigwigs in the electricity business. So now, Sashko, wouldn't you be able to do something to help us get another power plant in here? It would definitely be a worthwhile thing to do, you know. We'd have hay. And the gardens would give more. And if you think about it, the electricity would almost come free.... So we talked the situation over among ourselves there and then decided that if it all came down to the money involved, we could get a goodly sum together. And why not? We were a lot poorer before and we still built one....

A little background information

"To develop our agriculture at the rapid pace desired, particularly in the immediate postwar years, required cheap energy, the primary source of which at that time was the hydraulic energy (white coal) of the small rivers of the Ukraine. Over the course of the entire period of postwar reconstruction (1945-1965), kolkhoz money supported the construction of more than 700 small hydroelectric power plants on the small rivers of the Ukraine for the purpose of electrifying agricultural production and generating electricity for the various local industries. This period also saw the construction of over 220 other water projects designed to supply water for both public consumption and irrigation...."

"Vodokhozyaystvennoye stroitelstvo na malykh rekakh" [Small-River Water Projects]. Kiev: Budivelnik, 1977

"What could I say to my fellow villagers?" Aleksandr Mikhaylovich asked, his brow arched questioningly. "That my dear people were absolutely correct, of course. That they already knew without anybody having to tell them. But if such splendid facilities as this one here, for example, have fallen on hard times and to a great extent are simply going to waste, and then if in the files there are documents indicating that they are no longer fit for operation, then what do you think would be the attitude toward the Skelskaya GES, which has now virtually ceased to exist? Somewhere up there in the ministries the idea took root at some point that these old guys had served their purpose. That their useful life had come to an end and that they were over the hill. But has anybody ever figured up what it actually cost to put these facilities up back then? When after the war the kolkhozes, laid waste by the war



and impoverished, scraped together their last kopecks to be able to put an electric light in the huts. To get a little more light on things out on the farm. And look, these indestructible dam walls were put up for the most part by hand. But now, when we've got facilities and equipment like this available to us, it turns out there's nobody around to maintain and repair it. The power engineering people are continually insisting that the equipment is obsolete. That might bear looking into. But even if that were the case, what would this equipment cost? Three hundred thousand, five hundred? And to build a dam like this, and the machine room, you'd be out over two million. Or more, maybe? And then in addition to that, think of the benefits derived from the irrigation and the free electricity to boot. And there's also the fact that, ecologically speaking, this is the cleanest form of energy there is...."

Some more background...

"The Kuntsevskaya channel-type hydroelectric power plant was constructed in 1958 on the Vorskla River in Poltava Oblast's Novosanzharskiy Rayon. The high banks of the channel made it possible to create a head of 4 m along the sides of the channel.... The main structure of the power plant was built on a solid slab of steel-reinforced concrete. Inside this building were installed two mixed-flow turbines with an automatic speed regulator. With a head of 4 m and water flow rate of 13 m<sup>3</sup>/s the Kuntsevskaya GES has a capacity of 400 kW and an annual power-generating capacity of 1.76 million kWh. The Kuntsevskaya GES supplies power to five kolkhozes and the rayon center of Novyye Sanzhary."

"Vodokhozyaystvennoye stroitelstvo na  
malykh rekakh." Kiev: Budivelnik, 1977

"People say that the kilowatts these power plants generate cost more than those produced by the state network. That these facilities are sometimes more expensive to maintain," Aleksandr Mikhaylovich observed pensively, brushing back a lock of hair which had fallen down over his face. "If you look at the problem, as they say, in isolation, on its own terms, then this might be the case. If, on the other hand, you look at it from the point of view of the zealous, painstaking management responsible for husbanding every single kopeck of government money.... Say, for example, a kolkhoz decided to add the Kuntsevskaya GES to its own balance. Wouldn't this be something of a wrong-headed move? Certainly not! In the first place, for the kolkhoz the GES means well-watered fields and meadows and, ultimately, hay. And where there's hay there's going to be milk and meat. In the second place, the farmers here are planning to start up their own greenhouse operation together with the power plant. Now, how much do cucumbers cost in January? And tomatoes? So, this greenhouse operation alone is going to cover all the operating expenses. And not only that, it's not going to take a single kilowatt more from the state network. Then there's the reservoir, which provides water for irrigation.... And this marvelous, invigorating, rejuvenating environment.... As far as expenditures are concerned, they're not really going to amount to all that much. You see the by-pass canal over there about a hundred yards away? It would be a worthwhile thing to open up the levee and let the Vorskla flow through this canal. Repair the GES to your heart's content. Incidentally, one of our experts was somehow saying to me the other day that if they would just give him the bare minimum of tools and equipment, construction materials and ten thousand rubles (the workers he would get together himself), within a month and a half he would be able to invite everybody to a grand opening ceremony. So there you

have it. So could you really say the problem involves the Kuntsevskaia GES alone? How many of these ownerless GES like this would find in the republic nowadays?!"

Why are the GES falling silent?

In Vinnitsa Oblast's Yampolskiy Rayon alone the power plants in Pisarevka, Mironovka, Belaya and Klembovka have fallen silent. The Sednevskaia GES in the Chernigov area, a facility which once supplied the electricity for seven kolkhozes, is also now silent.... The fact is that you could look at any oblast, and you would find GES which used to operate and generate electricity, facilities built with funds put up jointly by the soviets of a number of kolkhozes. Poltava Oblast is but an example. It is not entirely typical of all the other plants, however. It would indeed be hard to point to another situation in which party, soviet and industrial management authorities have given so much attention to the fate of these small electric power plants, attention like they have given in Poltava, where from one year to the next we have seen them working to get them turned over to the rightful owner.

...The white structure of the Ostapevskaia GES rises up before us unexpectedly. From a distance it appears improbably fragile, the subject of a fairy-tale scene within a heavy green frame. But nearby we are surprised to see the vast, imposing wall of the dam and the powerful framework of steel beam supports. Even more striking is the scene that meets our eyes inside the building. Whitewashed walls and a clean tiled floor. A dull gleam from the paint on the equipment.

"I built this plant with my own hands. I was something of a handyman at the time, but then I became the leader of a construction brigade," N. F. Kravchenko tells us as he greets us together with N. M. Ivanchenko, who runs the Eastern Power System operation here. "And then I worked for many years here as a mechanic. So you could probably say I've had my hands on just about every piece of rock and every screw in the place at one time or another."

"And how long do you think it would take to get the place fired up?"

"How long?" Kravchenko's voice cracked and grew suddenly a little hoarse. "Well, if you're not in any hurry...."

He turns and looks silently at Ivanchenko.

"What do you think, Nikolay Mikhaylovich? Do you think we can do it?"

With permission granted, we see a change in the eyes. A huge, gray-haired man, he suddenly takes on the appearance of a small child.

"Come on, you guys, let's lend a hand here...."

And in an instant a number of the men who had greeted us were pitching in to help get the equipment running.

How many minutes did we wait? Three? Five? And then we could hear the pulleys work up speed. The lights began to light up on the control panels. And finally a quiet, scarcely audible hum filled the building.

Kravchenko turns to us, his face beaming. He motions with his hand toward the quivering needle on the equipment controls:

"We're now at design capacity. We could still go on line today!"

A little later, still not entirely settled back down after all the excitement, he remarked sadly, "They retired this place early. It was early.... Just like me, for example. I'm drawing my pension now, but I can't just sit around and do nothing.... And this place would be good for another 20 years or so of power generation without any repairs. Isn't that right, you guys?"

And these "guys," among whom were both gray-haired old-timers and some very young men, nodded their agreement....

A summary document from the official records

"Reference: USSR Ministry of Energy directive No. 78 of March 17, 1984, 'Utilization of the Hydroelectric Power Potential of Small Rivers'

"...A study has been undertaken of the operating condition of the Ostap'yevskaya GES in the village of Ostap'ye, V. Bagachanskiy Rayon, Poltava Oblast.

"The 375 kW Ostap'yevskaya GES was operated from 1957 to 1978. The GES was installed with machinery of foreign manufacture. It is not currently in operation because of the deteriorated condition of the main hydraulic, mechanical and electrical systems.

"The portion of the facility above the water line and the earthen levees are still in satisfactory condition, but the wooden gates need extensive repairs. The commission did not look at the underwater portion of the structure or the spillway.

"The facility has no automatic fire-extinguishing system. None of the hydraulic, mechanical or electrical systems was modernized during the period the facility was in operation. At the time the facility was inspected, the overall condition of the equipment would be said to be 'inoperable'...."

V. P. Mukomel, commission chairman

The mechanic at the Ostap'yevskaya GES had been able to get this equipment started up in only a few minutes.

Let's listen to N. I. Dzin, deputy chairman of the Velikobagachanskiy RAPO [not further identified]:

"We're going to be bringing this GES on line before too long. The oblast executive committee has already issued a decree to this effect. With what objective, you ask. Well, the benefits are obvious. Economy? Most certainly! Particularly if you take account of the 2.5 million-cubic-meter reservoir that goes with it! And the one at the Kuntsevskaya GES is just about the same size. As you probably know, the experts have already put together a project involving the irrigation of 1000 hectares. Now each irrigated hectare should produce the equivalent of two or three unirrigated hectares. So, consider that."

The situation looks a little different at the Velikosorochinskaya GES. One gloomy August afternoon we visited this facility together with N. M. Ivanchenko. It was a cold day with periods of rain.

#### A little background

"The Velikosorochinskaya GES, which has a capacity of 340 kW with a head of 3.2 meters and a water flow rate of 16 m<sup>3</sup>/s, was built on the Psel River in Poltava Oblast's Mirgorodskiy Rayon. The hydraulic component of the facility consists of the concrete spillway, the structure of the power plant itself and the water intake. On top of the dam have been installed the Ukraine's first two roof-shaped hydraulic gates, each with a span of 18 m. This design allows the gates to open automatically at the beginning of a period of high water and then close when levels have receded to normal.

"The water intake and underwater portion of the facility are made of concrete, the above-water sections of brick. Over the course of a year in which water levels are, on the average normal, this facility can generate 1.9 million kWh of electricity. Construction of the facility required 4200 m<sup>3</sup> of both regular and reinforced concrete."

"Vodokhozyaystvennoye stroitelstvo na  
malykh rekakh." Kiev: Budivelnik, 1977

"This is a unique facility," Nikolay Mikhaylovich points out, shivering and pulling his coat more tightly around him against the wind. "But in 1982 one of the roof gates collapsed and fell to the bottom. And it's lying right over there...."

Ivanchenko gestures over in the direction of the dark, churning waters of the Psel.

"They tried to bring it up, but it didn't work. But as far as the dam and the structure itself are concerned, they're not showing their age in the slightest. And the equipment can always be repaired."

"And what's to be done about the gate?"

"What are they going to do about the gate?" Nikolay Mikhaylovich repeats the question. "Open up the levee on the by-pass canal. Drain it. Raise the gate, and then repair it. Or replace it with a new one. This will all be doubly beneficial, because when the gate collapsed the reservoir went with it. And the reservoir, after all, held some one and a half million cubic meters of water."

"And what's all this going to cost?"

"Well, it's not going to be cheap. But of course, it wouldn't cost anything like as much as the structure itself. Something that big...."

From the official records

"The dam at the Velikosorochinskaya GES is still in good condition and would require no repairs. The other GES dams need work.



"This work will require outlays totaling 156,000 rubles."

"Engineering-economic justification for altering the channel of the Psel River and improving the flood plain within the limits of Poltava and Sumy Oblasts."

Kharkovgiprovdokhoz State Institute of  
Planning and Surveying, 1980

A quiet atmosphere of neglect reigns at the Sukhorabovskaya GES as well. Water laps at the gates. Indistinct patterns of light play in the great dark windows of the structure here. It's hard to believe that it's been years now since the place was put into preservation. The machine room is clean and in order. Everything's been painted and whitewashed, just as though the owner had put everything away in hurried preparation for a get-away.

"Neither this place nor the Shishakskaya GES would need much work at all," Ivanchenko remarks in an attempt to describe the situation here in some general way. "All you'd have to do would be to fix the turbines and repair the wooden parts of the protective panels on the gates and the place would be ready to go. Otherwise, the same thing will happen to them that happened at the Belotserkovskaya GES.

"...It looks like a hurricane hit the Belotserkovskaya GES. After the wooden dam collapsed, the GES was completely abandoned by the owners. And the scroungers took advantage of this situation to load up and cart off a lot of things for themselves, a chance to get a lot of things for nothing. Anything they could cart away, they carted away. Whatever they could break up, they broke up.... They ripped doors and window sashes out of the structure, ripping out pieces of the structure itself along with them. Bunches of broken wires would be hanging down from holes in the equipment where once upon a time the quivering, dancing needles indicated the condition of the unit. Some 'enterprising' owner has now even begun to rip out the ceiling. What fate awaits what remains of the place in the future isn't really all that hard to imagine....

[10 Oct 86 p 2]

[Text] The bureaucratic fuss

Is it really possible that nobody at all cared one way or the other about what was going to become of the small electric power plants and the facilities, which were assests of no small value in either the material or the moral sense? And is it really possible, finally, that the fate of the small rivers was going to be a source of concern to noone at all?

Not by any means. This was a cause of concern. The author is fully justified in this assertion. Local bodies have been engaged over the course of all these years in repeated efforts to solve this difficult problem.

From the official records

The Council of Ministers of the Ukrainian SSR

Upgrading the mechanical condition and improving the operation of hydraulic works of rural oblast hydroelectric power plants



"During the period 1953-1959, nine rural hydroelectrical power plants were built on small rivers within the oblast with the objective of providing electricity for agriculture and which, in addition to solving the energy supply problem, also now made it possible to regulate the flow of these rivers, water the grass lands in the flood plain and to irrigate previously unirrigated crop land.

"But as kolkhozes were added to the state electric power network, the quality of the operations and technical maintenance at these hydroelectric power stations began to decline. The hydromechanical and electrical equipment began to deteriorate, the hydraulic facilities themselves, particularly the wooden parts, requiring either replacement or extensive repairs. This created the situation in which both the Velikobagachanskaya and Rashevskaya GES were destroyed by high water. The Belotserkovskaya GES finds itself in a critically deteriorated condition. Failure to take timely measures will in time reduce still other facilities to a similar state, which will in turn degrade flow quality on the Psel and Vorskla rivers.

"The executive committee of the oblast soviet asks that the UkSSR Ministry of Power and Electrification be directed to undertake the required repairs on rural GES and maintain them in the proper operating condition; should it not be possible to operate a GES for power-generation purposes, the hydraulic facilities themselves should be repaired and turned over for operation by the UkSSR Ministry of Land Reclamation and Water Resources as a water regulating facility.

October 16, 1981"

The importance of this problem is not open to doubt. Particularly considering the fact that it involves the future of some of the Ukraine's best-known rivers. The republic council of ministers has directed the UkSSR Ministry of Energy to work on an effective solution to the problem.

From the official records

The Council of Ministers of the Ukrainian SSR

The operation and maintenance of rural hydroelectric power plants in Poltava Oblast

"The UkSSR Ministry of Power and Electrification has discussed UkSSR Council of Ministers directive No. 3345/70 of October 22, 1981 concerning the operating condition of rural GES and the need to regularize operation and maintenance procedures at these facilities in Poltava Oblast and reports that we have instructed the Kharkov-energo industrial power engineering association to repair rural GES within the oblast carried in the Kharkovenergo balance during 1982.

"Once the hydraulic facilities are repaired consideration will be given to the possibility of turning the reservoirs and associated facilities over for operation by the water management authorities of the UkSSR Ministry of Land Reclamation and Water Resources.

"The 315 kW Belotserkovskaya GES, which was built by kolkhoz funds, is currently being operated under lease. It is not of durable construction, while the equipment is worn out and obsolete and in view of its condition should be written off.

"In view of the fact that the UkSSR Ministry of Energy does not have the authority to write off equipment and facilities on the kolkhoz balance, this question should be resolved jointly by the owner of the GES and the rayon executive committee.

"Proposals to this effect and justifications for writing off the Belotserkovskaya GES should be submitted to Kharkovenergo.

December 28, 1981

It now looked as though the issue had finally been moved off dead center. But alas, even the most fervent declarations of intent will in some instances remain that and nothing more...declarations of intent....

From the official record

The Council of Ministers of the Ukrainian SSR

"...The Council of Ministers of the Ukrainian SSR has directed the UkSSR Ministry of Energy to take measures to improve the operating condition and regularize maintenance procedures for rural hydroelectric power plants. This directive, however, has yet to be followed up by any action.

"The Kharkovenergo industrial power association has not performed the required repairs on rural power plants.

"The executive committee of the oblast soviet of people's deputies has asked that the UkSSR Ministry of Power and Electrification be directed to move immediately to perform repairs on the Sukhorabovskaya, Ostapyevskaya, Shishakskaya, Velikosorochinskaya and Kuntsevskaya hydroelectric power plants, to insure that these facilities are maintained in reliable operating condition and, should it be impossible to employ them for power-generation purposes, to perform the necessary repairs on the hydraulic works themselves and turn them over for operational purposes to the UkSSR Ministry of Land Reclamation and Water Resources."

This letter was written in 1984. The calendar is now showing us in the closing months of 1986....

Who's closing the lists to the river?

The discussion in the office of Petr Mikhaylovich Shilo, second secretary of the Kotelva rayon committee of the Communist Party of the Ukraine, was a difficult one. But this should have been expected. How many weeks running now had the rayon kept its tenacious hold on last place in the summaries showing progress with the fodder making. The experts had been beating a path to Kotelva to give some practical assistance. The oblast central office had issued a directive concerning the situation. And then to top it all off here comes this reporter.... After having visited a number of farms, your author felt it necessary to inform the rayon committee and the RAPO of what he had learned about the general state of affairs. About downtime on the AVM, about instances of negligence and irresponsibility in the use of resources...

The chairman of the RAPO council, M. Ya. Petrenko, acknowledged the truth of this with evident bitterness and made some entries in a notebook.

"We are taking this into account, of course. But there's another side to this business as well: we haven't had a drop of rain all summer. You've seen what the grassland looks like. They're not meadows, they're burned-off waste lands. There's a little something left for the livestock to graze on, but that's about it. And then there's the equipment.... But what good would it do? There's not even a bagfull of grass to be cut with a scythe out there. Ah, the grass we used to have in the meadows around here. The old-timers talk about the times when they could make two years' worth of hay from the grass here....

Some background

"Here are some data on hydraulic works by numbers in the Poltava area in 1923. On the Orel River there was one water wheel and two water turbines. On the Vorskla 34 water wheels and 4 water turbines. On the Psel 20 water wheels and 20 water turbines...."

(The Poltavshchina Collection,  
Poltava, 1927)

"We obviously need to get serious about the irrigation problem. Particularly since we've got the Vorskla so close here...."

"Absolutely. This is the only solution to the feed problem we can see." M. Ya. Petrenko opened up a packet of paperwork lying in front of him. "You'd never guess where all this has been. But the train, as they say, still hasn't left the station."

From the official record

Memorandum on construction of regulator sluice on the Vorskla

"Kolkhozes in Kotelevskiy Rayon, Poltava Oblast, are recording extremely low feed yields from one year to the next, which is having a negative impact on efforts to meet planned livestock feed production targets.

"Representing a major source of increases in feed production are the some 2500 hectares of meadow and grassland within the floodplain of the Vorskla River, which because of the low level of the water in the river and of the underground water here during the summer are drying up and have virtually ceased to yield any kind of growth for fodder at all.

"In 1977, with support from Bilshovik Kolkhoz, the Kharkovgiprovodkhoz Institute prepared draft documentation for the construction of a regulator sluice costing 1,035,000 rubles.

"Raising the level of underground water by means of this sluice will enable kolkhozes in the rayon to harvest another 20,000 tons of fodder crops each year and more and irrigate some 1500 hectares of natural feed crop land. Implementation of modern agricultural measures on this land will yield another 30,000 tons of feed.

"This regulator sluice will therefore make it possible to produce another 9000 tons of feed units.

"This increase in feed production will in turn translate into production of another 6000 tons of milk or 1000 tons of beef, which in money terms comes to some 2 million rubles.

Kotelevskiy Rayon Committee  
Communist Party of the Ukraine"

"You have doubts about those figures?" Petrenko asks bitterly. "The results of the operation of sluices like this are already in, you know. The new sluice at Poltava, for example, is giving the training farm at the Yubileyny Agricultural Institute in Poltava over 1000 quintals of fodder beets per irrigated hectare and more than 200 quintals of potatoes. You don't have any trouble with that, I hope. And just think of what the new sluice has done for Velikobagachanskiy Rayon!

"But all we ever hear is that there isn't any money available. No...but everything's here," Petrenko concludes wearily.

He fell silent. The author suddenly recalled the words of A. M. Tsekhmistrenko, a power engineer and designer:

"What's to account for all these bureaucratic barriers? You'd think there'd be nothing simpler: just take and combine the efforts of the Ministry of Energy and the Ministry of Land Reclamation and Water Resources. An electric power plant, after all, represents more than just a source of energy. It's also a huge reservoir of water, something that promises the tremendous benefits of irrigation. It also means something for the health of the river. Not just today, but the health of the river in the future as well. We simply don't have the right to refuse to attempt to return the water to its former strength. To restore life to the meadowlands. To restore beauty. After all, we are creators. And then on the other hand, the Ministry of Land Reclamation is building a new sluice. This is a potential electric power plant. What does a turbine cost as compared to a dam? Take a look at these new sluices. And remember: the water flowing through them could also be generating power.

"Now, as far as the money's concerned, you can find money any time you want it.... Here's an example. How much are industrial enterprises in the Poltava area alone contributing to the budget for water use? More than a million rubles. So why don't we use this money for the benefit of the Vorskla and Psel rivers? They are the ones earning the money. So, like the foreman at the plant, let's cover the order for what's been done."

...On the way back to Kotelevskiy Rayon, the author stopped at a high concrete bridge. In the brilliant light of the sun the Vorskla at Likhachevka looked like a thin blue ribbon. And then suddenly I couldn't believe my eyes. A man sitting on the opposite bank stood up and started walking straight toward me through the water. Without even rolling up his pants....

P.S. As Ye. I. Udod, chief of the administration in charge of running electric power networks for the UkSSR Ministry of Energy, told the author, the ministry is responsible



for some 60 small hydroelectric power plants. Eighteen of them are not in operation. The ministry plans to modernize the power plants referred to in the article over the course of the coming year. Of the 42 plants currently in operation, 39 require repair and renovation. And what about the others? What is going to become of them? Do you recall that we mentioned the figure 700? So it is not only the fate of these facilities that concerns us. After all, the fate of the dams is linked to the larger problem of the fate of the rivers....

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## ELECTRIC POWER GENERATION

### FIRST FUEL ASSEMBLY LOADED FOR THIRD UNIT AT ROVNO AES

Kiev PRAVDA UKRAINY in Russian 17 Oct 86 p 1

[Article by PRAVDA UKRAINY correspondent A. Bondarchuk: "Another Step Toward Start-Up": "First Fuel Assembly for Third Power Unit at Rovno AES Loaded with Nuclear Fuel": "Million-Capacity Unit in First Phase of Physical Start-Up"]

[Text] After hearing reports from all his services, the director of the AES, V. A. Korovkin, gave the order to load fuel. The operator carefully monitors the instrument readings. The tension among all personnel present was understandable—how would the first test go? The instruments showed that in fact all processes were proceeding normally.

Vladimir Aleksandrovich thought back to December 1980 when the first power came on line, and then to the time a year later when the second unit began producing power. And now the meter was already showing over 26 billion kilowatt-hours of electricity. But the third unit was much more powerful. It was going to be the first million-capacity unit at the AES. It had involved major efforts on the part of builders, installers and assembly people as well as maintenance and operations personnel. Special requirements were imposed involving the implementation of measures to insure the safety and reliability of both the third unit and the two units already in operation, where a great deal of additional work has been done.

Turning in the stand-out performances, according to what the people here are saying, have been a number of construction organizations belonging to the USSR Ministry of Power and Electrification. These would include the Yuzhteploenergmontazh, Elektroyuzhmontazh, Energovysotspetsstroy and Energokhimzashchita administrations.

Maintenance and operations personnel worked virtually hand-in-glove with the construction, assembly and installation people. They bore responsibility for a highly critical phase of the project. Because not only did everything have to be properly assembled and installed, but all these complex systems had to be tested down to the last detail, thoroughly checked out and then properly linked up with one another. Specialists and workers from Reactor Shop No. 2, from the electrical shop and from the central repair and the automatic heating system and monitoring shops worked unflaggingly. The men in charge of the these organizations, A. N. Kazmin, V. N. Yesikov, S. N. Butkin and A. Z. Vislyy, worked harmoniously with one another and demonstrated their ability to coordinate efforts. The climax of these efforts came with

the report of O. M. Federov. Oleg Makarovich heads up one of the most critical components of the entire operation here—the automatic control system which regulates the various processes under way within the power unit.

The first step toward the start-up of this million unit-capacity facility has now been taken. Power from these units will soon be flowing into the country's powerful electric system.

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## MOTOR VEHICLES, HIGHWAYS

### GOSAGROPROM OFFICIAL ON TRANSPORT SUPPORT IMPROVEMENTS

Moscow *TEKHNIKA V SELSKOM KHOZYAYSTVE* in Russian No 11, Nov 86 pp 3-5

[Article by V. I. Dubovik, deputy chief of the mechanization and electrification department of the USSR State Agroindustrial Committee, under the rubric "The Decisions of the 27th CPSU Congress -- in Life!": "For Agroindustrial Motor Transport -- Highly Productive Use"]

[Text] "Significantly increase the effectiveness in using resources that are allocated to the agroindustrial complex."

From the "Main Directions in the Economic and Social Development of the USSR During 1986-1990 and for the Period to the year 2000"

The decisions of the 27th CPSU Congress provide for an average annual increase of 14-16 percent in the production volume of agricultural products during the 12th Five-Year Plan. Naturally, this will call for a significant increase in the number of transport shipments. During 1985, USSR State Agroindustrial Committee motor transport carried approximately six billion tons of freight. The state is sparing no effort to improve the transport support of the agroindustrial complex. During 1975-1985, the motor vehicle pool of the ministries and departments, which joined the USSR State Agroindustrial Committee, increased by 22 percent, and its freight-carrying capacity -- by 47 percent. During the current five-year plan, agriculture will receive 1.6 million cargo trucks and 1.77 million tractor trailers.

The numerical growth in the motor vehicle pool, however, is not being accompanied in a number of the country's regions by a substantial improvement in the transport servicing of the agroindustrial complex, especially during the harvesting period. Their productivity has decreased during recent years, and shipping costs have grown.

One of the main reasons for this situation is the scattering of motor vehicles among small truck fleets. In addition to kolkhozes and sovkhoses, enterprises and organizations, who have been entrusted with the centralized shipping of agricultural freight, have more than 24,000 small truck fleets that operate at the same time. On average, each rayon center has 8-14 of these truck fleets. According to data from statistical accounts, the productivity of the motor vehicles in them is 40-50 percent lower than in large fleets, and the

specific expenditure of fuel is 1.5-fold higher. The volume of centralized deliveries of material and technical resources to farms and the shipping of agricultural products from kolkhozes are increasing slowly. The kolkhozes and sovkhoses are compelled to carry out approximately 40 percent of these shipments using their own transport.

The scattering of the motor vehicle pool among small truck fleets also leads to violations of work and transport discipline. A total of 33 percent of the road and transport accidents that occur in the country's national economy fall to the share of USSR State Agroindustrial Committee motor transport.

Today in the village, a radical restructuring of the management of the agroindustrial complex is taking place and the economic mechanism is being improved.

The elimination of departmental barriers has created the required conditions for concentrating motor transport and for raising the level of the transport servicing of the agroindustrial complex by this. The experiences of a number of rayon agroindustrial associations, which have been created on the basis of small self-financing truck fleet garages, testify to this. Thus, the establishment in 1982 of a large transport enterprise in the Bobrinitzkiy Rayon Agroindustrial Association in Kirovograd Oblast has permitted the volume of centralized shipments to be increased 1.5-fold during the past three years and fuel expenditures to be decreased by 27 percent. The level of trailer use in truck fleets has grown twofold, and empty runs by motor vehicles have been reduced by eliminating backhauls.

The concentration of larger cargo vehicles and the establishment of a center for controlling shipments in the Vileyskiy Rayon Agroindustrial Association of the Belorussian SSR has permitted all livestock products and 95 percent of the milk to be shipped in a centralized manner, kolkhoz and sovkhos transport to be completely freed from transporting animal feed and petroleum products, and shipping costs to be significantly reduced. Today, these truck fleets are being established in many rayons in the Bryansk, Orenburg, Kuybyshev, Saratov, and other oblasts of the RSFSR, the Ukrainian SSR and the Belorussian SSR. This process is continuing in the other republics of the country.

The calculations of specialists show that it would have been possible to transport an additional 500 million tons of agricultural freight and to reduce fuel expenditures by 1.2 million tons during 1986 by pooling the motor vehicles that were located in the rayon centers.

In order to further improve the transport services of the agroindustrial complex, it is planned to concentrate motor transport (except the transport engaged in technological shipments on kolkhozes and sovkhoses) in the self-financing truck fleets of the rayon agroindustrial association with specialized columns or branches and rayon centers for controlling shipments as immediate measures.

It is necessary to establish production transport associations in oblasts (krays and autonomous SSR's), having entrusted them with the functions of



organizing centralized shipments and also the organizational, technical and systematic directing of the work of rayon agroindustrial association truck fleets.

In this regard, special attention is being paid to the completion in 1986 of the establishment of permanently operating rayon(inter-rayon) centers for controlling shipments.

The many years of work experience by the centers for controlling shipments in a number of agroindustrial truck fleets in Stavropol Kray and Minsk, Tambov, Saratov, and other oblasts have shown that they are studying freight traffic; compiling a transport balance-sheet; developing plans for the transport servicing of kolkhozes, sovkhoses and other rayon agroindustrial association enterprises; and organizing the loading of motor transport in the same direction. They are performing a great deal of organizational work during the preparation period for the harvest. They are calculating the required number of motor vehicles for the centralized motor vehicle detachments for delivering grain from the farm threshing-floors to the receiving points and processing enterprises and for the staffing of the harvesting and transport complexes. They are inspecting the kolkhoz and sovkhos threshing-floors and are ascertaining their working conditions and the number and productivity of loaders. On the basis of the data obtained, they are developing hourly work schedules for the motorists using electronic computers. During the harvest period the shipment control centers are reinforced with workers from other transport enterprises and converted into centers for controlling the delivery of grain and sugar beets.

Thus, in 1985, centralized management of sugar beet deliveries was introduced in all rayon agroindustrial associations in Cherkassy Oblast, and detachments composed of larger cargo vehicles and CPS-4.2 beet loaders were established in the truck fleets. This permitted the daily output per vehicle to be increased from 16 to 30 tons and the number of vehicles, engaged in transporting sugar beets, to be reduced by 2,000.

For operational management of the loading and transport detachments, the sugar beet shipment control centers have radio communications with the farms and brigades that they are servicing. Many centers use electronic computers to compute the hourly shipping schedules. The shipping control center of the Izobilnenskiy Sugar Plant in Stavropol Kray calculates the hourly work schedules of the motor vehicles delivering sugar beets from 28 farms in five rayons with the help of an electronic computer. The economic effect from incorporating automated control systems has reached approximately 1.5 million rubles during the past 10 years.

The use of loading and transport detachments permits the kolkhozes and sovkhoses to be freed from loading sugar beets and transporting them to the processing enterprises and the efforts of the farms to be concentrated on organizing the harvesting process for the roots and transporting them from the harvesting units to the roadside rollers, that is, to organize the harvesting and transporting of the roots to the sugar plants using the transshipment method.



During 1985, more than 1,100 loading and transport detachments, including 940 detachments in the Ukraine, operated during the harvesting of the sugar beets. The use of the equipment within the detachments permitted the seasonal output per sugar beet loader to be increased by more than twofold, the idle time of transport systems while loading to be reduced by 40 percent, and -- what is the main thing -- the gap between the digging and transport of the sugar beets to be reduced from 3.5 to 1.5 days.

The activity of the shipment control centers permits the level of organization in freight shipments in a village to be increased, especially during the harvest period. We see in them a service which should be constantly engaged in improving the transport services of the kolkhozes and sovkhoses and in raising the effectiveness in the use of transport systems.

Considering that the shipment control centers must perform a great deal of work to study freight traffic, compile transport balance-sheets and develop rational shipments for various types of freight, the VNIPIASU [All-Union Scientific Research and Design Institute for Automated Control Systems] has developed and issued for industrial use programs for solving these tasks using an electronic computer.

The experience of the organization for the centralized control of transport and procurement work using electronic computers deserves special attention and active incorporation. During 1985, 559 shipment control centers were established based on transport enterprises during the harvest; of them, 132 used electronic computers to calculate the hourly work schedules of the motor vehicles. The calculation of the hourly schedules was carried out using both a single system electronic computer and a Robotron-1720 FBA [not further identified] with a GMD [not further identified]. The use of the latter completely satisfies the main requirements that have been placed on the planning and management of plant product shipments that are calculated using hourly schedules.

Moreover, an opportunity exists to calculate the hourly schedules daily directly in the rayon shipment control center, that is, three-four hours before the beginning of transport and procurement operations; and to abandon the use of data receiving and transmitting equipment and, correspondingly, the rental of communications channels and the transmitting of operational information to the oblast computer center and back.

A number of oblasts in the Russian Federation, the Ukraine, Belorussia, Uzbekistan, Latvia, Moldavia, and Tajikistan have accumulated positive experience in the use of electronic computers in the work of centers for organizing the transport services of enterprises and organizations in the agroindustrial complex.

The introduction of advanced methods for the transport servicing of harvesting equipment and of centralized management for transport and procurement operations in agriculture during the harvesting permitted the daily output per vehicle to be increased by 14 percent during 1985 and brought it to 18 tons.

During the current five-year plan, it is necessary to insure an expansion of the centralized delivery of freight to the farms from the supply bases, railroad stations and supplier factories and the completion of the shift to acceptance directly at the kolkhozes and sovkhoses and to the shipment of animals, poultry, milk, potatoes, vegetables, berries, and grapes from there. The volume of these shipments is growing by more than twofold.

The solution of this task requires the summation and improvement of the progressive experience in delivering large lots of cargo by larger cargo trucks and truck trains using the brigade form for organizing the work of the drivers, a brigade contract, and specialized rolling stock, containers, packaging, and pallets. The experience of the Kharkov Specialized Truck Fleet No 1, which has introduced the transporting of milk from rayon plants to the Kharkov Dairy Combine by the "shuttle" method using a brigade contract, deserves attention. A total of 13 KamAZ [Kama Motor Vehicle Works]- 5410 and 21 semi-trailer tankers have been allocated to the brigade. The drivers transport the tankers which have been filled with milk in advance. This permits, practically speaking, the elimination of idle time for the vehicles at the loading and unloading points, the twofold increase in the output for one average listed vehicle ton, and the obtaining of a savings of 50 tons of diesel fuel and 33,000 rubles in the wage fund.

Together with the management of the Volga Railroad, the Saratov Oblast agro-industrial association is taking steps to concentrate the freight, which is arriving for agriculture, at 17 railroad stations instead of 39 and to deliver this cargo to the farms using the forces and equipment of specialized truck fleets. This has permitted more than 500 farms to be freed from sending their vehicles to the railroad stations, and it has also reduced the demurrage of railcars.

The percentage of centralized shipments of animals and poultry has reached 80-85 percent in the Lithuanian SSR and Stavropol Kray.

The Belorussian SSR State Agroindustrial Committee has organized the manufacture of larger size tankers and has insured the centralized delivery of the entire volume of petroleum products. This has permitted approximately 4,000 kolkhoz and sovkhos drivers to be freed.

Positive experience in organizing the centralized dispatch and delivery of agricultural freight exists in all union republic agroindustrial committees. It is necessary to perform a great deal of work for its incorporation, insure the manufacturing of specialized rolling stock in the system's enterprises, and provide for the allocation of loading and unloading devices for equipping the larger cargo truck detachments that are engaged in transporting bulky cargoes.

Especially large tasks are now being imposed on the transport service of the agroindustrial committee in organizing the transporting of freight and in increasing its role in the work to incorporate progressive forms and methods for delivering agricultural products. One of the most effective ways to intensify the harvesting process is the method for organizing work by harvesting-transport complexes.

The work experience of the combine operators' harvesting links, which are headed by N. V. Pereverzevaya and N. V. Bochkarev -- Heroes of Socialist Labor and USSR State Prize Winners, and the driver brigades of G. L. Korotkov and P. A. Svetlich in Rostov Oblast, serves as an example of many years of fruitful cooperation between the machine operators and the drivers during the grain harvest.

During the procurement of fodder in Stavropol, Krasnodar and Altay krais and in Rostov and a number of other oblasts, the harvesting and transport complexes are equipped with KamAZ, ZIL [Moscow Motor Vehicle Works imeni Likhachev]-133 and Ural-377 large cargo vehicles that have been equipped with special attachments for unloading the silage mass. The daily output per vehicle in these complexes has grown to 100 tons with a shipping distance of seven kilometers.

The zonal distribution of agricultural production and the difference in the ripening times of grain and silage crops has caused the requirement to establish large harvesting and transport detachments for the harvesting of grain and the procurement of fodder, which have a complement of combines, tractors and vehicles; are located in rayon centers; and based on USSR State Agro-industrial Committee enterprises. Thus, in 1985, approximately 1,250 detachments worked at harvesting grain, and 650 detachments -- at procuring fodder. These detachments have been operating for a number of years in the Russian Federation, Belorussia, Kazakhstan, the Ukraine, and other republics. The seasonal output for one combine in the harvesting and transport detachments exceeds the output on kolkhozes and sovkhozes by 40 percent; and the output per vehicle -- by 25 percent.

However, the opportunity for increasing the productivity of transport systems during the harvest is not being fully used.

Thus, the combine-trailer and proportional methods for delivering grain from the combines to the farm threshing-floors using circulating vehicle trailers have not received the required dissemination in the RSFSR, Ukrainian SSR and a number of other republics. This permits the productivity of the vehicles to be increased substantially and shipping costs to be reduced. The system of centralized control of transport and procurement operations during the harvest using electronic computers is being slowly introduced, despite the fact that there exist computer centers in all oblast (krai) agroindustrial associations.

At the present time, the USSR State Agroindustrial Committee is taking decisive steps that are aimed at the general introduction of centralized control in shipping agroindustrial complex freight using electronic computers so as to carry out the shift from transport self-service to shipments of mass goods using the centralized method, the brigade organization for the work of drivers, and container and packaged shipments. Among the factors that insure the successful solution of the assigned task, it is especially important to single out the need for increasing the percentage of specialized rolling stock in the motor vehicle pool by decreasing the number of on-board vehicles.



## RAIL SYSTEMS

### BRIEFS

**EKIBASTUZ SPUR LINE OPEN**--Ekibastuz (Pavlodarsk Oblast), TASS--Start-up of the first power unit of the Ekibastuz GRES-2 [State Regional Power Station] is still more than a year away, but its fuel supply has already been assured. A railroad spur line linking the coal deposits, the city and the power station's construction site has become operational. For the time being, passenger and freight trains will travel the line instead of the instead of trains loaded with fuel. This will permit several bus routes to be closed down needed construction materials and structures to be delivered twice as fast as by the regional highway. Starting up the railroad line, for which the service and supply mains have been completed, ahead of schedule has made it possible to concentrate efforts on erecting the main building of GRES-2. [Text] [Moscow SELSKAYA ZHIZN in Russian 26 Oct 86 p 1] 9194

**ANGARSK RAIL DEVELOPMENT**--Irkutsk--The first PPZhT [industrial railroad transport enterprise] is being set up at Angara Junction in eastern Siberia. The "Promzheldortrans" enterprise will be one of the largest in the country. Petrochemical workers have transferred to this specialized organization almost 200 kilometers of their siding lines, several stations, diverse equipment [obustroystva] and railroad crews. The new enterprise will service the "Angarsknefteorgsintez" All-union Association, cement and mining works, gypsum, ceramic, electromechanical and a number of other plants and the TETs [Heat and Electric Power Station]. The amount of loading and unloading operations for the PPZhT will be more than 20 million tons per year. The enterprise will be part of the Krasnoyarsk "Promzheldortrans" Association. [By V. Sesevkin, GUDOK correspondent] [Text] [Moscow GUDOK in Russian 28 Oct 86 p 1] 9194

**NOVOCHERKASSK GRES SPUR LINE**--Rostov-on-Don--Track workers of the Rostov line section have constructed a 3-kilometer spur using their own resources. The spur connected the ash dumps of the Novocherkassk GRES with the main line. Uses for the slag have long been known at a number of enterprises within the construction industry. They make constituents of road coatings, fire brick, finishing plates and, finally, they use it as fill in road construction. All of this was held back by a single drawback--circuituous and, consequently, costly transportation. With the appearance of the most direct rail line, the volume of products made from slag will increase by a factor of 3. [By S. Velichko] [Moscow GUDOK in Russian 28 Oct 86 p 1] 9194

**IMPROVED GONDOLA CAR PLANNED**--Kremenchug (RABOCHAYA GAZETA correspondent)--The Kryukovskiy Rail Car Building Plant's gondola car earned an assessment of approval from foreign specialists at the international exhibition of rail transport in Moscow. Its capacity is 75 tons, considerably more than its predecessors. Railroaders may use it at higher speeds. The design of the couplings and uprights has been improved, and the opening has been widened. The new gondola's designers are plant design engineers A. Shvets, V. Barbashov, and I. Andrushin; chief of the engineering bureau of rail car building Ye. Dudkin and technologists A. Marchenko, L. Yasinskaya and others. It has been planned to start industrial production of the new car in 1990. But at the plant, they have decided to move the date up by 3 years. To do this, they are installing a new conveyor in the car assembly shop using their own efforts. A creative group of specialists, headed by V. Larinov, the plant's chief engineer, is already finishing up the design work-up for the conveyor. The installation crews have been set up. Everything is being done so that the railroaders can take delivery of the first few hundred new gondolas next year. [Text] [Kiev RABOCHAYA GAZETA in Russian 31 Oct 86 p 1] 9194

**KRIVROY ROG LRT LINE**--Krivoy Rog--A test train made a run over the LRT [light rail transit] line in Krivoy Rog on the eve of the anniversary of the October Revolution. The construction workers, who finished their work a month ahead of schedule, were the passengers. The mainline's start-up sector is 8 kilometers in length. Some of the boarding platforms at stations are at a depth of up to 10 meters underground. The tunnel dimensions are the same as for a subway system. The rose colored granite, cast aluminum and ceramic plates lent a colorful, holiday air to the underground halls. "Our collective is experienced in cutting underground structures," says Yu. M. Zelenkin, chief of tunnel unit No. 26 of "Minskmetrostroy." "And it came in very handy here. At practically every meter we had to freeze the ground and utilize a number of technical innovations. The workers from many city enterprises and organizations helped us tremendously. They moved hundreds of thousands of cubic meters of soil during Saturday and Sunday work days given to the state, and they erected bridges and other complex engineering structures." The Czechoslovakian combine "ChKD-Praga" build the cars for the Krivoy Rog metro. During peak hours, the trains will run every minute at a speed of 35 kilometers per hour. Finishing work is now being completed on the run. The subway builders have promised to put it into operation by the end of this month. The first line's express trains will carry about 8 million passengers per year. [By M. Neklyudov, RATAU [Radio and Telegraph Agency of the Ukraine] correspondent] [Text] [Kiev PRAVDA UKRAINY in Russian 6 Nov 86 p 3] 9194

**MARABDA-AKHALKALAKI LINE PROGRESS**--Akhalkalaki--The builders of one of the highest altitude railroad lines in the country, the Marabda -- Akhalkalaki line, have started operational traffic over the entire course. It links the center of Georgia with its alpine regions and will be called on to provide accelerated social and economic development of a multinational region. Today electricians are far beyond Pokani Station; they are quickly installing and hanging the contact wire. Support towers are already in place along the whole run. The line will soon be totally electrified. In a word, much has been done for today, there is still much to be done. The primary portion of the program ahead must be completed in the few weeks remaining before heavy snows and severe cold which, by the way, are just as bad as those in Siberia. Now



it is very important to speed up the building facing and finishing work and to get ready to turn over the keys to residential buildings at Akhalkalaki-Passenger, Pokani and other stations. It is particularly important to quickly finish ballast operations on the Bogdanovka-Akhalkalaki sector. [By S. Babayan, GUDOK correspondent] [Excerpts] [Moscow GUDOK in Russian 13 Nov 86 p 1] 9194

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